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AUTHOR Miller, Anne
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ABSTRACT

Transcripts are included for 11 videotaped lectures on automotive repair for non-English-speaking adult students. An answer key is provided for two student workbooks of exercises based on the lectures. Lecture topics are: "Introduction to Autobody Repair," "Hand Tools," "Power Tools," "Use of Hammer and Dolly," "Picking and Filing," "Use of the Disc Grinder," "Plastic Filling," "Welding," "The Spray Gun," "Introduction to Painting," "Preparation for Painting," "Final Preparation and Spot Painting." (JB)

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ENGLISH FOR SPECIAL PURPOSES SERIES

AUTOBODY REPAIR

HEARSAY

VIDEO TRANSCRIPTS & ANSWER KEY

ED181734

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
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ANNE MILLER

Edited by
Alfred G. Hoel

Video Lectures by
Herbert Nishii

FL 010 902

2

Produced at Honolulu Community College
1977

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Produced at Honolulu Community College, 1977.

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The initial members of the staff-- Al Hoel, Kathy Hubbard, Bill Peet, Marybeth Clark and I-- created the idea of having video-based listening materials.

Herbert Nishii, an autobody student, and part-time autobody repairman, planned the content of the video lectures and then skillfully delivered the lectures and demonstrated the autobody repair techniques before the camera. He was also my primary source of information about autobody work.

Steven Downey, also a student, set up the video equipment and did the camera work for lectures VI through XII. He then edited all of the lectures into Series A and Series B tapes, a laborious task completed with equal amounts of precision, skill and patience.

Stanley Oganeku, the director of the Autobody Repair Program here, gave us permission to use the autobody shop and equipment for some of our videotaping sessions; he and other instructors also provided us with technical information whenever Herbert Nishii was not available to answer our questions.

Katsumi Ige, the media technician for the Instructional Resource Center, arranged for our use of the IRC videotaping equipment, studio, editing room, and monitors. Bill Wiley, the director of the Instructional Resource Center, also assisted us in the production of our materials.

Sumie Ono, the director of the Learning Assistance Center, made LAC rooms available for our students and teachers to view the tapes and conduct classes.

The students with whom we used the materials gave us much valuable feedback as to the relative difficulty of the different lectures and the exercises written for the lectures.

Ofelia Berzabal, Yong-Ok Park, and Tanh Van Phan, the bilingual teachers, regularly helped the students and me in the video listening classroom, and also provided me with good advice and suggestions as to the editing of the lectures into different series.

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A.M.

Honolulu, Hawaii
August 1977

TABLE OF CONTENTS

Acknowledgments..... iii

To The Student..... vi

UNIT I INTRODUCTION TO AUTOBODY REPAIR..... 1

UNIT II HAND TOOLS..... 4

UNIT III POWER TOOLS..... 13

UNIT IV USE OF HAMMER AND DOLLY..... 20

UNIT V PICKING AND FILING..... 25

UNIT VI USE OF THE DISC GRINDER..... 29

UNIT VII PLASTIC FILLING..... 36

UNIT VIII WELDING..... 45

UNIT IX THE SPRAY GUN..... 59

UNIT X INTRODUCTION TO PAINTING..... 65

UNIT XI PREPARATION FOR PAINTING..... 75

UNIT XII FINAL PREPARATION AND SPOT PAINTING..... 85

Answer Key--Series A..... 92

Answer Key--Series B..... 107

TO THE STUDENT

These texts are designed to be used with video-taped lectures. There are two purposes for these listening materials and lectures. The primary purpose is to help you develop your ability to understand American English as it is spoken by a native speaker. A second purpose is to provide you with information on autobody repair.

Before watching each part of a video lecture for the first time, look in the workbook for the Preview and the Questions To Think About for that part of the lecture and read them. Having this information will help you understand the lecture. The Preview and Questions To Think About are translated in your translation manual. You should also look in the translation manual for the vocabulary used in that part of the lecture, and familiarize yourself with the words and meanings.

As you watch each part of the lecture for the first time, try to get the general ideas as the lecturer explains them. Please do not read your translation vocabulary or any of your other texts as you listen, since if you keep your eyes on a book you will miss the important visual aspects of the lecture and demonstrations.

After watching the video lecture part, go to the Exercises in your workbook and read them over. The translation manual contains the translations of the directions for each of the Exercises. Try to answer the questions you know, but avoid spending too much time on them: the teacher will soon play the same video lecture part over again, and you will have time later to complete the exercises.

The second time you watch the lecture, you can also glance at the Exercise questions and/or the translation vocabulary in order to listen for the answers to specific questions or to listen for particular vocabulary words. In your translation text, the list of vocabulary words are written in the order in which they are said in the lecture parts.

After listening to the video lecture a second time, finish answering the exercise questions.

When you do the Multiple Choice exercises, do not select the word choices simply according to the words you hear on the tape. You will do better if you carefully read and think about all the choices and then select the ones which make sense, based on all the information which Herbert Nishii gave in the lecture.

For the Cloze exercises, however, you will fill the blanks with the exact words you hear Herbert Nishii use in the sentences as you listen closely to the tape several times.

The Fill in the Blanks items are similar to the Cloze exercises. You can listen closely to the tape to write, word-for-word, the phrase or words you hear Herbert Nishii use in the same sentences. The main difference between the Cloze and the Fill in the Blanks exercises is that the Cloze requires you to listen for single words, but the Fill in the Blanks exercises require you to use any number of words necessary to complete the sentence.

If there is a Pick the Pictures exercise, your teacher will read the leads (questions or statements) for which you are to choose the corresponding picture(s).

For Label the Pictures exercises, however, you can simply write the name of the pictured item in the space provided under the picture. The rest of the types of exercises in your workbook are fairly simple and need no clarification.

When all of the students finish doing the exercises, the teacher will go over the exercises with the class, asking you for your answers and letting you know which answers are correct. If necessary, the teacher will explain why an answer is correct or incorrect, and/or play the same lecture part over again, so you can listen for a particular exercise answer. Do not hesitate to ask any questions you might have. If you continue to have trouble understanding any particular section of a lecture, your teacher can give you a transcript of the tape to read while you listen again to the lecture.

To get maximum benefit from your listening classes, you should: 1) make sure you understand the content of the lecture at the time you are listening to it in class; 2) periodically review the names of the tools and the repair procedures covered in earlier lectures; 3) memorize the new vocabulary found in each lecture; 4) frequently review and use all of the vocabulary so that you do not forget it.

You might find, at first, that the lectures and exercises are difficult. Please do not get discouraged! Gradually, with practice, you will begin to understand more of Herbert Nishii's speech. You will also learn how to do the exercises more easily and rapidly. Do not expect to be able to get all of the answers correct at first. The development of listening and reading skills takes time and a lot of practice, and that is a purpose for which these texts were designed.

A.M.

Honolulu, Hawaii
August, 1977

UNIT I

VIDEO LECTURE

INTRODUCTION TO AUTOBODY REPAIR

SERIES A (Part 1)
SERIES B (Parts 1**, 2**)

1** Hi. My name is Herbert Nishii. I'll be doing the lecturing for a program in this session called "Autobody Repair and Painting." Autobody repair and painting is basically fixing cars, car bodies. You have basically two jobs, one which would be a metal man, which would do, basically, the repairing or replacing of damaged parts of the car. You also have a painter, which does repainting of this repaired area or of the complete car.

2** What you do in the metal work is basically you pull dents, you fix frames, you know, the undercarriage of the body. You probably align doors, that means you fit doors on, hoods. You also, later on, will probably tackle larger collision work, or the cars you see that get into accidents. Those type of things. As for painting, you learn to basically mix paints to form different colors, you sand cars, tape cars up, and you try to make the car look new again.

SERIES A (Part 2)
SERIES B (Parts 3**, 4**)

3** In autobody repair and painting, you work for somebody at one time or another. At this time, right now you'd be able to get paid probably two dollars and forty cents an hour up to a little over seven dollars, depending upon the rating you have. You start out probably at two forty and you work your way up to

3** (continued)

seven dollars or a little over that.

4** In order to get this pay, your boss wants you to perform well, to work very fast, and to do jobs that will please the customers, because basically he's in the job to make money. That's why you have to work fast. You have to work hard so that you can perform well. You have to be able to sweat a little bit. So autobody repair and painting isn't an easy job, it's hard, and it's very--very--whatyoucall-- fulfilling.

SERIES A (Part 3)
SERIES B (Parts 5**-7**)

5** Besides being a very hard job to work at, autobody is a very hazardous job. You have various safety precautions you have to take in order to keep alive, say, or keep uninjured. Basically, you wear various masks, such as your particle mask, when you work with plastic filler. You have a respirator, here, which has two filters, and this is used when you paint the various cars, touch-ups, like that.

6** Along with these masks, you use various eye-protection, such as these goggles when you use the power grinder, or when you use the drill, and when you're basically blowing things around with the blow gun. Another type of eye protection you use is your welding goggles when you perform the operation of welding. These are all safety precautions you have to take.

7** Besides these safety precautions you have, you have to know where your fire extinguishers are in case of fire. You have to, you should wear various foot protection such as your

7** (continued)

steel-toed shoes such as these here. The steel toe here protects your toes from being chopped off, from having something fall on it, and basically you don't want to walk around without toes. So safety-toe shoes should be used. And, if you can, try and remember the number 911 in case of an emergency.

SERIES A (Part 4)
SERIES B (Parts 8**, 9**)

8** Besides being hazardous, a hazardous job and a fulfilling job, autobody is a very dirty job. You deal with oil and grease. You have various dust, like your plastic filler. You have paint spilling all over you. It's a job where you have to get dirty. If you get dirty, if you get dirty, you know you've worked good. You also get cuts and bruises, lot of scars on you. It's a job that you know you've worked well when you're dirty and you're beat up. Really.

9** Clothes-- clothes you wear for this type of job would be basically maybe a cool T-shirt, very cool, light, comfortable type of shirt, and your pants should be also comfortable, very comfortable. And also very old. They're gonna get dirty. If you notice these pants are all stained, dusty, have a lot of dirt on it, even have holes in the knee here. It's a job where you have to dress comfortably and yet your clothes are able to get dirty. Something you can throw away later on. So, autobody is a dirty job, it's a very hazardous job, it's also a very fulfilling job and if you can get into autobody repair and painting, you'll probably like it a lot. If you can't, that's okay.

I

UNIT II

VIDEO LECTURE

HAND TOOLS

SERIES A (Part 1)
SERIES B (Parts 1**, 2**)

1** Basically in autobody repair and painting, you're gonna be carrying around a set of tools which would be called your basic hand tools. These tools may consist of a set of hammers and something also used with these hammers. And then, to start it off I'll tell you about the finishing hammer, the picking hammer, your shrinking hammer, a two-pound ball-peen hammer, and what you use along with them would be an all-purpose dolly.

2** Going back to the finishing hammer, this one here, you'll notice that it's a wedge-styled back, which is also a little wide. The face here if you notice, is slightly rounded or crowned. And your handle. Your finishing hammer is used for bumping and dinging, bumping and dinging-- or, in simpler words, it would be smoothening out-- smoothening out-- damaged metal. That would be your finishing hammer.

SERIES A (Part 2)
SERIES B (Parts 3**, 4**)

3** Here we have your picking hammer. You notice that the back is long and very pointed. Here your face again is also slightly rounded, or crowned. This picking hammer is used for picking up low spots for filing. What I mean, is, if you have

3** (continued)

a very small, tiny dent, what you do is pick it up and then after you pick up, you leave a slight hill which you file off. That would be your picking hammer.

4** Okay, another hammer you have would be your shrinking hammer. It would look something similar like this. The side you use, however, for now, will be this side, the face which has the ridges on it, the various pimples. This one here, what it's used for, is to bring down slight bulges you have in your metal. What you do is, you hammer on to your metal, your bulge, and what the ridges do is, it pushes down on certain parts of the metal and pull it in. Instead of bulging up, it's pulled down with the use of these ridges. So your shrinking hammer, your purpose or use-- used for the bringing down of slight bulges in metal. That would be your shrinking hammer.

SERIES A (Part 3)
SERIES B (Parts 5**, 6**)

5** This hammer here would be your 2-pound ball-peen hammer. 2-pound ball-peen hammer. It's a very heavy hammer it probably will be the biggest hammer you have in your toolbox. So it's easy-- easily recognizable. What this hammer is used for is basically roughing out large dents. That way it'll be easier to bump and ding with your finishing hammers and your picking hammers and also your shrinking hammer. So this is just to use for roughing out-- used for roughing out. And let me remind you, this is used before the other hammers I showed you before. That

5** (continued)

would be your 2-pound ball-peen hammer.

6** A tool you use with the first three hammers, your finishing hammer, and your picking hammer, and even your shrinking hammer, you'd be using this tool here. This would be an all-purpose dolly. Or a high crown dolly, whichever you prefer. It's a very heavy tool. This one is used for smoothening out metal. Also, basically, for roughing out also, hitting out major dents with your-- with this tool placed in your hand like this. Basically it's used for-- used for bumping and dinging with finishing hammer and also for roughing out. That would be your all-purpose dolly.

SERIES A (Part 4)
SERIES B (Parts 7**, 8**)

7** Other tools you'll be using besides your hammers will be probably your water pump pliers, a pair of regular pliers, a one-fourth-inch drive ratchet, a three-eighths drive ratchet, and also a set of sockets for each of these. With your three-eighths drive ratchet you also have various extensions. Your water pump pliers and your regular pliers, which would be these here, are also-- are probably used for basically grabbing things, holding onto things, say, maybe nuts and bolts or even somebody's finger. Even you can use these to pry things. So your use for holding, grabbing, and prying things. Those would be your pliers.

8** Next, your quarter-inch drive ratchet, which would be this one here, and sockets, various sockets. Your three-eighths drive ratchet and its set of sockets here. And along with your three-eighths drive ratchet you have various extensions for these sockets, so you can have a longer reach at things. Basically these ratchets are used for removing and putting things on. Used for putting on, or taking off nuts and bolts. Different sized ratchets for different sized jobs, the smaller the ratchet and the sockets, the smaller the job. If you have a bigger job, go with a bigger ratchet and bigger sockets. Those would be the purposes of your ratchets.

SERIES A (Part 5)
SERIES B (Part 9**)

9** More hand tools we'll be discussing here will be a set of screwdrivers. Note the various sizes. A set of phillips screwdrivers. Also notice the various sizes. As you notice up here, your screwdrivers are usually the flat, wedge tip type of screwdrivers. You notice you have the different sizes. These would be your screwdrivers. Your phillips screwdrivers are different. They're pointed, not wedged-shaped, and they also have four points, if you look at it very closely, four points, one here, one on the side, one on the bottom, one on this side here. These would be called your phillips screwdrivers. Basically, these two sets of screwdrivers are used for the-- are used for putting on and taking off of screws. Used for putting on and taking off of screws. It could be either standard-- standard screws or phillips screws. Hope you folks can read

9** (continued)

that. That would be the purpose of your screwdrivers.

SERIES A (Part 6)
SERIES B (Parts 10**, 11**)

10** This here would be your roloc disc. This is used with a regular hand drill. You just put it in the drill chuck and it's used with a specially designed type of sandpaper. It's a very very rough sandpaper, and it's used to grind in various tight corners or small spaces. That means it cleans out or sands off the paint or rust which you have to repair which are in very very small corners. That's the way it's been designed, very small for very small places. Again, your roloc disc is used for-- for cleaning out, or grinding, I should say and/or grinding, used for cleaning out and/or grinding various small places. Again, your roloc disc is used with a drill, and uses very special-design sandpaper.

11** Here we have a wire brush. This is used where your roloc disc or a certain tool called the disc grinder can't remove the rust. This you use in those places where rust is left behind. It's this wire-- wire-end-- wire-end brush. It's also used with the drill , regular hand drill, and again, it's used for-- for cleaning out-- out rust which the roloc disc or power grinder has left behind.

SERIES A (Part 7)
SERIES B (Parts 12**- 14**)

12** Another set of tools you would be using would be probably a set of files. You have three different files. One would be your speed file, which is shaped in this manner, very long, very flat, wide, and also easily handled. You can hold it well very comfortably. You use this with sheets of sandpaper, and you use this to cut the plastic filler, sand it, make it smooth, and it's used to reveal high spots and low spots in your plastic filler. And also to make it smooth. Your speed file. Used to cut down high spots and to reveal low spots. Also used to smoothen plastic filler.

13** Another file you have is your Vixen file. This one here. It's made out of metal. Also very flat. Also very easy to handle. Easily-- very easily used, very comfortable. However, this file isn't as wide as your speed file, but very narrow, very flat, very sharp. The Vixen file is used like the speed file. However, instead of plastic filler, it's used on metal. So your Vixen file-- used to cut down high spots, high spots, reveal low spots, and to smoothen-- not plastic filler, but metal. The metal on your fenders, your roofs. your hoods of the car, any type of metal. Your Vixen file will be able to do all of these.

14** Here we have your Bondo file. This one here is-- looks

14** (continued)

like a cheese grater, notice the type of file it is, looks like a cheese grater. It's slightly round, this one here is, slightly round. They also come flat. This is used for cutting or shaping your plastic filler. It's used for shaping your plastic filler when the plastic filler isn't that hard yet, and that-- not that soft. Bondo file-- used for shaping plastic filler. That would be your Bondo file.

SERIES A (Part 8)
SERIES B (Parts 15**, 16**)

15** Along with your other tools, you have a reverse hammer. This one here has a handle like your screwdrivers, but very large so you can easily hold on to it, a sliding weight on a shaft here, a sliding weight, and also a sheet metal screw at the tip. What this reverse hammer is used for is that you drill a hole into a dent, you drill a hole, and you screw this end in. Screw it into the hole, and sliding this weight along the shaft, pulling it out, you pull the dent out also. The reason why you use a reverse hammer is because you can't get in with a regular hammer or your regular dolly from the inside, so you pull it from the outside. Your reverse hammer-- used whenever other hammers cannot reach so you pull dents instead of pushing it out with your hammer or your dolly. Your reverse hammer.

16** Another tool you have would be your tin-snips. Look like gardening shears. They're very large scissors, but very specially-made scissors. These scissors, or your tin-snips, is used for cutting metal. For any reason you have to cut metal, use the tin-snips. Those would be your tin-snips.

Next we have your blow gun, and also a measuring tape. Basically, your blow gun is used for blowing air. It's blowing air from a line connected to the compressor. So you have air blowing, which means you can clean things off, or even dry things, if something's wet you blow air on it, and it'll dry. Another thing would be your tape measure, and this is used basically for measuring distances between two points. So your blow gun-- used to blow air, and your tape measure-- used for measuring distances. That would be your blow gun and your tape measure.

SERIES A (Part 9)
SERIES B (Part 17**)

17** The final tools we have in your toolbox, which you probably are glad for, would be your putty knives here. Two different sizes, your plastic applicators or squee-gees. Those would be plastic applicators or squee-gees. Another thing would be your sanding block right here. Your putty knives and your squee-gees are basically used for two purposes. They would be mixing plastic filler and also the application of plastic filler. Those would be basically the primary purposes of your putty knives and plastic applicators. Used for mixing and applying

17** (contineud)

plastic filler.

The next tool you have would be your sanding block. The sanding block here is very flat, very flexible, and also easily used in the palm of your hand. It's used for sanding your plastic filler down to become a smooth surface and very presentable. That's your sanding block.

UNIT III

VIDEO LECTURE

POWER TOOLS

SERIES A (Part 1)
SERIES B (Part 1**)

1** Hi. Today Im gonna be talking about power tools. They run on either electricity or they run on air, and if you use them, you have to be careful with you power tools such as grinders, your feather edgers, even your long sanders, like that, which I'll be discussing today. Basically, the power tools you use are very hazardous. They run on your electrical currents which could give you a shock if your tools aren't in proper working order. Also your air tools, tools that run on your air lines from the compressor in your shop. Those could be also dangerous because a lot of air is going through the tool itself, and producing a lot of power. So when you use these power tools, try to be careful with them, and try not to abuse any of these tools.

SERIES A (Part 2)
SERIES B (Parts 2**-4**)

2** The first tool I'll be talking about now will be your various disc grinders. Your disc grinders come in basically two types of shapes. One would be these in here, this shape, or one would look similar to this air drill. A very small, compact type. On the larger disc grinders, you notice they have two handles, one here, one here, and the power source

2** (continued)

running from this handle here. This would be electrical. On this handle here you have an on-and-off switch, right in here, or it could be a trigger type such as this one up here. This handle here is used for your free hand, the hand you have free that will have to grip this handle here in order to maintain control of your disc grinder. This handle here is able to switch to either side of the tool, on this end here, or where you see it now.

3** This disc grinder is basically about-- say-- about one and a half feet long. It could weigh about seven pounds, so you know it's a very bulky, very large type of tool, and with this tool you take very precautious measures when using them. It's very dangerous, and if not used properly, it could be a hazard to your personal being. You notice this disc shape down here on both of them. This disc here holds what they call the disc, sanding disc. This head right in here, this attachment, rotates at about-- say-- four thousand to five thousand five hundre r.p.m. So it's pretty fast and if it's on, and it touches you, you know y 'll get a big cut from it. So, watch out. Five thousand five hundred r.p.m. is very fast.

4** In your othei disc grinder, the one that is, that resembles this air drill, it's a very small, compact type of grinder. It's-- it has a pistol grip like this, so you can use it with one hand. You notice that the trigger in here, right here, is the on-and-off switch, and it lets the air flow through to a disc which is attached right about here. So this would be

4** (continued)

an air-- air grinder, this would be your electric. Going back to the air again, this one here weighs about two pounds, two to three pounds. It's about seven inches long. Notice how-- the difference between the larger ones and the smaller one. It's a very compact tool.

Both of these tools are used for removing rust, for removing paint, to smoothen small imperfections in your metal, or minor irregularities, or-- how you say-- just bumps in your metal, bumps in your metal. They also-- it's also used to locate low spots in your metal after you bump and ding with your hammer and dolly, which will be another lesson we'll get into. Also, the disc grinder is also used to smoothen a metal called lead, and that's used for filling up various dents, and you could use it in place of plastic filler, which is also another lesson we'll get into. So, basically, that would be your disc grinders.

SERIES A (Part 3)
SERIES B (Parts 5**-7**)

5** Another tool we'll be discussing about today is called the orbital sanders. You have two types of orbital sanders, one is shaped in a rectangular style, the other is a round one. The pictures you'll see now are the types I'll be discussing about. This would be your rectangular orbital sander, here. This one here would be the round one. Both do the same job and they're used for feather-edging. Feather-edging. What I mean by feather-edging is that it's used for a gradual tapering

5** (continued)

of old finish, so that the old paint and bare metal form an uninterrupted smooth surface. What I mean by that is you notice in here, this caption over here, you notice a feather-edge. There's no large step like this. There's nothing like that. What it is is just a smooth, uninterrupted surface from the old paint to the bare metal.

6** Basically, your feather-edgers are in this shape. If you can see that this is a rectangular one. It's about-- say-- three-- three inches by nine inches. Three inches this way, nine inches by this way. It uses a special type of sandpaper that fits perfectly onto this tool. The on-and-off switch would be up here, and what you do is you-- palm it-- palm it. And when your palm pushes this lever down, it turns on the machine, and you use it that way. As for the other one here, it's also used for the same purpose; however in a different shape and probably in a style that is-- that is easily used. You grip it here, you put your free hand on top of this area here, and you just use it like the other one. You just put it on your surface and smoothen the surface you're using, you're gonna smooth out. This one also uses a type of sandpaper, very special one, that fits right on top of this head right in here.

7** So, your feather-edgers are used basically to smoothen old paint so that you have an uninterrupted smooth surface with the bare metal and the old paint. Another basic type of purpose you use with these orbital sanders or feather-edgers is to use it with plastic filler. After you cut it with the Bondo files

7** (continued)

or the sur-form files, you use this tool in here for the purpose of making a smooth job, a very smooth surface so that you don't have any bumps or dips inside of your plastic filler. You want a very smooth surface. And this is what these two orbital sanders, or feather-edgers could be used for. So, besides feather-edging, they're used for sanding and smoothining plastic filler.

SERIES A (Part 4)
SERIES B (Part 8**)

8** Another tool that's used for sanding and smoothening your plastic filler would be a tool called a straight-line sander. It's a very long sander, as you can see here. It's long. You use two hands for it, one to grip the trigger in here, the handle here, and one to grip this ball-knob here. This-- this tool resembles your speed file, your sandpaper file, the long one we discussed in your basic hand tools. However, this one here runs on air and you don't need to use that much elbow grease, or that much hard work for sanding. So, this one here is about three inches wide. It's about eight inches long. And probably about six and a half pounds heavy. On this one here, again, the purpose is used for very large areas of plastic filler, and this is to smoothen your plastic filler out. This would be your straight-line sander.

SERIES A (Part 5)
SERIES B (Part 9**)

9** Okay, here we have two more power tools you'll be using in your autobody shop. Basically these are used after you've painted a portion of the car. These two things are polishers, or air buffers. You notice one resembles the electric grinder, and you have a different style here. The one you'll be using most times in the autobody shop would be this one here. This large-- larger one here. It's about the same size as your electric grinder. However, it doesn't spin as fast. Probably your electric grinders spin at between four thousand r.p.m. and five thousand five hundred r.p.m. whereas your your-- polishers, these two, would spin probably at two thousand five hundred r.p.m. to three thousand r.p.m. So it's considerably slower than your electric grinders. You notice both-- both of them have cloth or woolen heads for polishing. Basically these are used for compounding or polishing cars after painting. Those would be your air buffers.

These would be called air wrenches. Air wrenches. You notice that they come in pistol shapes, here, and hand shapes, hand-form shapes. Here. These tools are basically only used for removing these nuts and bolts from your various body panels of the car. So, if you want to remove nuts and bolts faster, use these air wrenches.

SERIES A (Part 6)
SERIES B (Part 10**)

10** Another tool, the final tool, thank goodness, that you'll probably be using in your body shop is something you'll probably use only for cutting panels or cutting metal. Or probably separating metals that have been welded together. This tool is called a zip gun or a panel cutter. This panel cutter, as you can see in this illustration here, used-- is used for cutting metal, if you can see that. This tool looks exactly like this here: these two. And they have special attachments which are used for cutting metal, cutting various welds on your metal, and you have attachments that even hammer various things, that you can smash things. This would be your zip gun. Also, one of the attachments would look something like that on the board. This attachment for your zip gun, or panel cutter, is basically a tool like this. In this area here it's very sharp. The reason for this being sharp is that you have your metal going through here, and the metal is quite thick, and this tool, here, or attachment, is used for cutting this metal. So basically, your zip gun or panel cutter is used for cutting metal. And that's it.

UNIT IV

VIDEO LECTURE

USE OF HAMMER AND DOLLY

SERIES A (Part I)
SERIES B (Parts 1**-3**)

1** Hi. Today we're gonna be talking about-- well, I'm gonna be lecturing to you about a basic operation in autobody called metal bumping and dinging with the use of the hammer and dolly. Or-- if you'd like to call it-- hammer-on-dolly operation. You'll be using these two tools, your hammer, which is in my right hand, and the dolly which is in my left. Basically now, I'll show you how to use each-- each one properly.

2** First, the hammer. You notice I'm using the basic finishing hammer I showed you that we have in the toolbox. Okay, when you folks hammer at home (you know) pounding nails, like that, you usually (you know) grip the hammer tight and you pound away at your tool-- your nail, right? You do that, you just grab the hammer real hard, pound on the nail, and you get the work done, right? Well, in body and fender work, you don't just grip the hammer real hard and pound. You have to control your hammer.

3** The use of control is through your fingertips, through your palm, and through your wrist. I'll show you. Basically, you try to grab (you know) your hammer in this type of fashion, here, all your fingers on one side and your thumb here. You grip the hammer, and from there, try to bring it out so that your fingertips hold it. Put it in here, to your fingertips. Basically, then, it's a fingertip and wrist motion, and hitting

3*** (continued)

back of your palm with the hammer handle. Basically, this type of movement is preferred with the use of the hammer. If you don't want the extra power, you just use your fingers. So the proper usage of your hammer is, again, with the fingertips, hitting the palm, with movement in your wrist.

SERIES A (Part 2)
SERIES B (Parts 4**-6**)

4** Here we have your other tool, the dolly block. Notice it's the high crown dolly you have in the toolbox, again. And you also use it in a comfortable way. You use it comfortably, you pick a portion of the dolly that conforms-- with the dolly itself. That means on the fender, the almost smooth side, you would use this. In an area where it's really round, you would use this, or maybe really round-- pointed, or even cornered. That would be using your various areas of the dolly to conform with the shape of the-- of the fender or the car body. So the basic (you know) positions of your hand (you know) are any way that is comfortable to you. Like that, you could use it in this way, or this way, hammer on it from here, could hold it with your fingertips, any way that feels comfortable with you. Any way that will get the job done. That would be the use of your dolly block.

5** From here, I'm gonna be showing you two basic types of operation. One would be a hammer-on-dolly on this portion of the fender, and then a hammer-off-dolly on this portion of the fender. To introduce hammer-on-dolly, hammer-on-dolly is when

5** (continued)

you put the sheet metal or the fender between your dolly block and the blows of your hammer. And you hammer it directly onto the dolly. I'll show you an example, and while I'm doing this, try to listen to the sound that's created with the blows of the hammer. Try to listen to that. What I'm gonna do is place the dolly behind this area in here. Right here. Hopefully, you can see that it's raised, like pimples. You notice it's like dots and it's raised. I'll be placing the dolly block behind this-- like-- I'll be hammering directly onto the dolly. Listen to the music you play. Every once in a while, while doing this operation you have to feel the contour of the body to show you how well its shaping up.

6** You notice that sometimes when you use the hammer and dolly, an area will bulge. I'll tell you, the reason why it bulges is because you're not bouncing your dolly back after each blow. The proper way would be to hit and spring back with the blow of the hammer. So it would look something like this from the side. If you just hold the dolly in place, and hammer on the metal just like this with no springing action in the dolly, you end up with an area where it stretch or bulges in the natural metal. After that, you grind the area, and then you plastic fill.

SERIES A (Part 3)
SERIES B (Parts 7**, 8**)

7** Okay, another thing we're gonna be talking about now would be hammer-off-dolly. To show you, this area here of the

7** (continued)

fender, you notice that there is a line right in here, hopefully if you can see it, there would be a slight ridge in here. This would be called your high spot of the metal because it is slightly raised over your metal. Right in here. Notice, around it in this area, right in here, it's low-- it goes in and then comes up high, into the high spot. What hammer-off-dolly is is placing the dolly back behind the low spot and push it up--push it up and at the same time hammer the high spot down. And this time, no springing action. No springing action in the dolly. This is straight push-- a straight push. So this would be hammer-off-dolly. Again I'll be using this part of the dolly, because it conforms with the shape of the fender. Place behind the low spot and pushing, pushing up, on the dolly, on the low spot, then hammering the high spot down. Notice the sound again. Okay, you notice here that the low spot has risen, notice the high spot did go down. This is the purpose of your hammer-off-dolly technique. Right now you can grind, and also fill with the plastic filler and your operation is completed. So that would be your hammer-off-dolly technique.

8** Okay. Here you see an illustration of what I've been trying to tell you. If you didn't see it in the showing of the fender, this is the right time to understand it. In this illustration you notice it's your hammer-on-dolly technique. You notice it's hitting the sheet metal right diectly onto the dolly, if you see it down here. You notice up here this is the before picture where he's hammering the high spot down directly

8** (continued)

onto the dolly. This would be your hammer-on-dolly technique. In another picture here I'll show you the hammer-off-dolly technique. Here we have your hammer-off-dolly. You notice the hammering is done on the high spot with the dolly block pushing up the low spot. Thus you smoothen out the metal. The hammer on the high spot in here, the dolly pushing up the low spot in here. So hammer-on-dolly, hammer-off-dolly, that's all you have to remember about basic metal bumping and dinging.

UNIT V

VIDEO LECTURE

PICKING AND FILING

SERIES A (Part 1)
SERIES B (Part 1**)

1** Hi. Today I'll be demonstrating to you a technique used by various body fender repairmen for creating a quality job. This method is very time consuming, so you need a lot of patience. However, you do create a very nice job, a quality job. This technique is called picking and filing. Basically you use your pick hammer and you use your Vixen file. Your pick hammer here, with the point, you use for the actual picking itself. You also have your head, or your face here, which is used also for your hammer and dolly technique and used for (you know) smoothening out your metal, or just hammering. However, today, this part here will be the important part, your point, to pick up the low spot, and we have your Vixen file here. Notice you have the handle here, your handle here, held like this. You also have your Vixen file blade, which has a type of cutting edge. Notice it's a very flat piece, so you do create a very smooth job. And also, this job is done basically on cars you own, people that want a quality job, or basically, a friend that wants a quality job. It's very rarely done in the autobody shop because it takes so long, you lose money.

SERIES A (Part 2)
SERIES B (Parts 2**, 3**)

2** Here you see a pick hammer. This is the proper way of holding the pick hammer for this method of repair. You notice that the finger's pointing in the direction of the head itself. You have your other fingers here and your thumb cradling the handle. And basically, it's a wrist movement in using this pick hammer. Notice that you're gonna hit the sheet metal in this manner here, like this. And notice the grip, notice the motion, notice your wrist movement. Hardly anything in the hands, it's held in your fingers, basically all, mostly done in the wrist itself. You also have to remember that when you use the pick hammer, you have to make believe it's an extension of your arm or your hand.

3** I'll be showing you right in this area here how-- how to create various pimples, of those slight hills I was talking about earlier, when I was showing you about this picking hammer before. You notice you have the x here, I have the x drawn in, and I'll try to pick, pick up some pimples right in this area here. When you're doing this basic operation, you have to feel the area where you want this point going. So I want-- I want the tip of that point going in this area here. So I have to feel this area and underneath, placing the pick hammer underneath, tap that area. When I feel the vibration at its greatest, or when you feel the vibration or the pick hammer directly underneath your fingers, that's when I'll know when to pick. So right now I have to feel it, tap the hammer against the sheet metal, and

3** (continued)

then pick up. You notice right in here. Now over here. Now up here. Basically, this would be your picking operation.

SERIES A (Part 3)
SERIES B (Parts 4**, 5**)

4** Here you see your Vixen file. This will be used to cut down those pimples I made in the sheet metal with the pick hammer. You notice the handle here, these two handles. Grab each end and you use it to stroke by pulling or pushing. Pushing or pulling. You notice this blade in here. You can see the various cuts, or the cutting edge, the grooves, the ridges on this blade itself. You notice the direction of the curve that these ridges make, the curve in here. You notice that the curves all point towards this direction in here, or towards the back. When it's in this position, it means that when you pull on it, it'll cut the metal or the-- cut the pimples off. If you have it the other way, where the ridges are pointing towards the front, towards the front, when you push it, that's when it'll cut, when you push-- push the file it'll cut the pimples, and when you pull, it won't cut.

5** So here I'll show you how-- how each of these pimples are cut by using the file. Okay, and another thing, whenever you sand, or whenever you file, try to always cross file. That means in one direction, and then in the opposite direction. So, cross-filing is when you file in one direction, and then file directly opposite. So here I'll be cross-filing this area here. And your basic operation for picking and filing is so that you

V

5°° (continued)

see all the shiny metal in here. And you have paint in here, you have paint over here, paint on the outside. The reason why they call this as a quality job is because when you pick, you're gonna pick up all this low spots all this parts you see the paint, and create a smooth surface by cutting it with the file. That means you put no type of filler into the low spots to create a smooth finish. You're creating a smooth finish with the metal itself. So, your picking and filing, again, say, is your quality job because you have no fill, you're using the metal that's on the fender itself. And you're creating a job that's very nice, very appealing. However, it takes very long, and it demands a lot of patience from you. You notice that I'll have to pick up all these low spots in here, I'll have to all file them all off, it'll take a lot of time. So that's your picking and filing operation.

UNIT VI

VIDEO LECTURE

USE OF THE DISC GRINDER

SERIES A (Part 1)
SERIES B (Part 1**)

1** Previously, I've been talking about various tools, been talking about various types of equipment, your power tools, been telling you various methods of repairing a car, a fender, through the use of your hammer and dolly, your picking and filing, and today, I'm gonna be going into-- probably, more or less-- one of the power tools you'll be using a great deal in the body shop. This power tool is called your disc grinder. This grinder here looks like this, this is a type you'd find in your autobody shop. It's a very large piece, very heavy, it's bulky. It's run on an electrical current. Notice that-- the wire here. It's a very dangerous machine when it's moving when you have it on. And you can get hurt from this machine. It's a very handy tool, however. It's used to remove rust, used to take off paint, used to locate low spots in your metal work. You can use it for also smoothening out metal after you've pick-and-filed, maybe even hammered-and-dollied. Your grinder here consists of your handle. You have a handle with your on-and-off switch. You have your backing pad. You have a center locking unit here which holds the backing pad and the disc, abrasive disc, onto your grinder itself so that

1** (continued)

it doesn't fly off when you're using it. You have your motor in here of your disc grinder. Your electrical cord, and basically you hold it, you know, whichever way you feel comfortable. That would be your disc grinder.

SERIES A (Part 2)
SERIES B (Parts 2**-5**)

2** Along with your disc grinder you'll be using your abrasive disc, which is used in order to remove the paint or your rust. You have three types of discs, abrasive discs that you'll use in your body shop. It goes from a fine, to medium, to very coarse. Basically, in each of your body shops, you'll probably use only one of these and that would be the heaviest one, or your 16-grit disc. This is the coarsest disc you have. It's used for creating a rough surface. It's for use with your plastic filler before you use plastic filler, and also just to cut down or remove the paint. Two other types of discs that you might find in your body shop but are probably not possible would be your 24-grit disc, which is your medium grit, and a 36 grit, which would be a finer grit. Your 24-grit is basically used like your 16-grit; however it's a lot finer. It's-- it leaves a lot shallower scratches in your metal. Your 36-grit is basically used for grinding bumpers. If your bumpers have been damaged, you use-- you repair your bumper, and before you send it out to your re-chrome shop, you use this 36-grit disc, a very fine disc, and you grind the area you repaired.

2** (continued)

So basically, you have three discs, you'll probably use only one in your body shop. That would be your 16-grit.

3** In order to put these discs on your grinder, what you have to do is, you have a center lock unit on your pad, your backing pad, okay? You hold the back of-- the back of the grinder behind the pad, which would be in this area in here. Try and hold that, and you turn the backing pad towards the left. Remove the lock unit here, take off the pad, put your disc on, onto the pad, put the lock unit back into the center, then tighten it up, okay? So you have your disc right in here, your grinding disc. You have your backing pad, and you have your grinder. You're all ready to-- all set to go when using this grinder. However, you have to hold it in a way where you're in complete control. You have-- you're comfortable, and also that you'll be able to do the job right.

4** Basically also, you have two types of grinding, where you're gonna start with a rough to a fine, or you just stay with the rough. When you sand from a rough surface and you go to a smoother, say that you're gonna use your 16-grit, and you're gonna sand some metal, grind metal down, gonna use your 16 grit, and then you're gonna go with your 24, then you go with your 36. That way it's all metal, no plastic filler whatsoever, no fill. You're just using the metal itself and creating a quality job. When you do it that way, what you have to do is try to use as much area of the grinding disc as possible. So that when it's on the surface, it's almost flat, this grinding disc is almost

4** (continued)

flat except for maybe about 5 to 25 degrees-- elevated in the back or on the side.

5** Another way of using the disc grinder is for creating a surface for only your plastic filler. When you use-- when you create a surface for your plastic filler, what you want is a very rough surface, so you use a 16-grit. And in using this grit, try to use only the edge. Only the edge of this disc, not the whole thing. This way it's more economical for the shop, you're only using a small portion on the outside, and still you're creating a rough surface for your plastic filler to adhere to your fender, or your panel, or maybe even your deck lid, trunk lids, like that. You don't worry about gouges in your metal. You don't worry about that because you're gonna fill it up anyway. So, use the edge. That way, you cut off the edge, you have the inside part of the disc yet to use. It's a lot more economical, you save a lot of money-- for your shop. So next, we'll be showing you how to use the disc grinder itself.

SERIES A (Part 3)
SERIES B (Parts 6**-10**)

6** Okay. Before showing you anything about how to use your disc grinder itself, I have to tell you a little bit about safety involved with your disc grinder. Once-- like I said in the beginning of this lecture, I said that the machine is a very dangerous machine. It's quite true because it does rotate at a very high speed, You notice that your disc, okay,

6** (continued)

your disc, when it's moving, is going very very fast. It ranges from maybe 4,500 r.p.m. up to about 5,500 r.p.m. And it's quite fast. You put your hand on the edge itself, you get a nice clean slice, so never try to put anything on the side unless you're gonna grind it. And you aren't gonna grind your arm or your face, okay. So, try not to get those things in the way. Even your fingers, don't get your fingers caught in front of this grinding disc. It's very fast, dangerous.

7** Another thing about this is that you notice it runs on electricity. Notice the cord, no breaks in the cord itself, no tears, that way you eliminate or you reduce the possibility of getting shocked. Another thing is your three-pronged plug. Some grinders come with only two prongs, which would be these two right in here, and if they do, it's quite all right. However, if it comes with a three-prong, always put this into the-- always have this part grounded. What I mean is that-- if you have only a plug for two prongs, and this part isn't grounded, the possibility of you getting shocked is very great. You might even die from this, electrocuted and baked. So always try to have this plugged in or grounded. This is your ground wire, right here. Right in here, this is your ground-- ground prong. So always have all of these prongs inside of the plug. Unless your grinder comes with only two, then always have your two prongs grounded.

8** Another thing about disc grinding is your safety shield, which you use to cover your face so that when you're grinding,

8** (continued)

the metal from your panel or the paint doesn't get into your eyes. You can ruin your eyes, you can go blind. So you always wear this safety shield. You notice the safety shield looks dirty. It's not dirt, it's scratches, okay, that's how much it protects your face. So try to use your safety shield when grinding. Always do. It's the difference between blindness, and being able to see various colors in the world. So always try to wear your safety shield.

9** Now I'll show you the two differences in your disc grinding, from a plastic filler or preparing for plastic filler, and just grinding smooth a car. First of all, make sure everything you have on your grinder is attached, you don't have to play with it except to turn it on and off. Your disc is on, your disc is on, you don't have to change anything. You're ready to go. That's when you plug it in, when you're ready to go. Put your face shield on first also. Then you can plug it in and start going. Also, try to watch the overlap on the panel itself. Try to watch the overlap I do with this grinder. The overlap meaning the different strokes I use in order to create an even surface. So I'll show you first how I would use a grinder, if I were to create a very smooth job, a quality job on my panel. That means I'm gonna be trying to use the most-- wait-- the largest amount of disc as possible. After I do this, I change my disc, I go to a finer disc and do the same thing. You notice that when I was grinding the paint off, the paint was coming off all in one single strip,

9** (continued)

and it was coming off nice and even, very even, coming off really well. It's very smooth right now, however, there is deep scratches in your panel.

10** Another method of using the grinder, like I said, is for preparing plastic filler. That would be to use the least amount of area on the disc at the edge. So I'll show that to you now. You notice the two differences in the angle of the grinder. One being almost flat, the other very tilted. Another thing is to remember in your disc grinding is that when you feel your metal after you grinded, the metal is not supposed to be hot. Your metal never-- never should be hot where you put your hand on and it feels like you'd burn your hand. Never grind-- whenever you grind, try never to get the metal that hot. Otherwise the chances of the panel warping is very great as compared to if you keep your grinder moving in-- in a direction, that way you keep the metal cool, that way your chances of warping the metal is very less. And that would be all for your disc grinding.

UNIT VII

VIDEO LECTURE

PLASTIC FILLING

SERIES A (Part 1)
SERIES B (Parts 1**-4**)

1** For the past couple of weeks I've been telling you about your basic hand tools, I've been telling you about how to use the hammer and the dolly, how to pick and file. I've been showing you various techniques in autobody. I've been also telling you about something, and putting off something for quite a while, and it's been called plastic filling. The plastic filling has revolutionized the autobody industry, because it has cut time in half so that body work can be done very quickly, be finished very quickly, and production is speeded up. Before, they used to use lead to fill dents, they used to rough out the sheet metal on the car body, and fill it up with dents, I mean fill it up with lead, and from there (you know) they'd finish it up and paint. Well nowadays, plastic filling has taken away all of that. All you do is just rough it up a little bit, make it almost perfect, the car body, mix your Bondo, put it on, cut it, sand it, paint it. Very simple. It takes very little amount of time. I'll be showing you how fast it can be today.

2** First of all I'd like to tell you about the tools I'll be using. But before I start, tell you about the plastic filler itself. It comes in any brand. Your plastic filler, the one

2** (continued)

I have here, is called Cuz, from Napa. Anybody can pick it up from any Napa store, and (you know) you can have different types of body filler, and (you know) they all do the-- do the work. You have your body filler here. You also have a hardening agent in here. This is called your catalyst, or your hardener, your cream hardener. You mix these two together to form a hard surface to work with. The next thing you'll be using besides your plastic filler would be your putty knives, and also your plastic squee-gees, which also come in different sizes, and you use the one which is right for the job. If you have a large job, you use the larger squee-gee or the larger putty knife. If you have a small job, use the smaller putty knife or the smaller squee-gee. Next you have your bondo files or your sur-form files, and these can be bought at any hardware store, and these are used in or-- used to shape the plastic filler itself. You cut-- cut the plastic filler before it hardens, right away, and you shape it to get a good surface, good clean surface.

3** The next thing you'll pro-- you'll be using besides your Bondo file would be your mixing pan, which could be made out of any flat surface. However, an ideal surface would be glass. To use glass, that's the best mixing surface for your plastic filler. Next would be the one I have here, the sheet metal. You can get any scrap sheet metal and if it's flat you can mix your Bondo on it. You can even use cardboard, if you like. Use cardboard to mix your Bondo on. However, your cardboard

3** (continued)

tends to soak up whatever liquids are in the plastic filler itself. So any flat surface will do. However, sheet metal or glass is more ideal.

4** Another thing you'll be using would be your feather-edger here. It is a power tool you have to watch out for. It's very fast sometimes. You control it through the air pressure here. Your trigger is on top here, and you just palm it like this, and you work over your area. Sandpaper fits right in here, so this area right in here will-- will be on the car body. Another tool you probably will use in accordance with this would be your sanding block. These two are the same. One is powered by air, one is by your arm. So it depends how fast you want to work as to which tool you want to use. Another thing to talk about is your sandpaper-- the type of grit of sandpaper. The lower the number on your sandpaper, the rougher it is. The higher the number, the finer the grit. So if I had a forty-grit sandpaper, it's a very very coarse paper. If I had a hundred or maybe a hundred fifty-grit sandpaper it's a very fine. And sandpaper goes from thirty-six-grit all the way up to six hundred. Six hundred is the finest you can get on the market right now. So basically these would be the tools you'll be using.

SERIES A (Part 2)
SERIES B (Parts 5**-8**)

5** Okay. Here you see two areas which I'll probably be

5** (continued)

plastic filling. Okay. This one here, which is very shiny, where all the paint is grinded off with a sixteen-grit grinding disc on your grinder, this area has been cut to bare metal for an ideal surface for plastic filling. Another ideal surface for plastic filling is one which looks like this-- a very rough surface. The paint, you notice, has not all been cut away. In other words, the surface is very very rough as compared to this one here. The reason why I have the two surfaces like this is because on this surface here, this is the recommended surface that is recommended on your plastic filling, on your plastic filler can. On the can of your plastic filler it says to grind down your paint, to remove paint and dirt like that, down to bare metal for your plastic filler. However, in the industry, you don't have time, or you can save a little bit of time by grinding it this way, in this fashion, a very rough grind. You also-- we also found out that while grinding it in this fashion, the plastic filler tends to bond or tends to adhere to the surface a lot better because it's a lot rougher. Whereas on this surface here, in production, as you speed up, you tend to do things a lot faster and your plastic filler tends to peel. Here, you can put your plastic filler on in very large quantities, shape it with your plas-- your Bondo files and sand it right away.

6** So I'll show you all those things right now. First of all, when you get your plastic filler, you open your can, and try to

6** (continued)

save whatever you can. You get your top like this, you take off whatever you can from the cover, put it into the can, try not to waste, because material is very expensive nowadays, and you want to try and comserve whatever you can. Next of all, try to mix your Bondo up very well, okay? Down here it tends to be a little bit harder, on the top it tends to be softer, okay. The reason for this is because all the liquid that's mixed up in your plastic filler tends to rise to the top. The heavier material tends to settle towards the bottom. So you try to mix it all up very well, and try to get the whole can evenly proportioned with liquid and your heavier material or your plastic filler. Again, try to save whatever you can so you try to scrape off your excess into the can.

7** Another thing you'll be working with is your cream hardener. Your cream hardener here is your catalyst. You mix this with your plastic filler and it gets hard. When you do this, whatever you mix with the hardener you don't put back into the can. You put it back into the can, you make-- it tends to harden the plastic filler that's in the can already. So whenever you use the hardener with your plastic filler, don't throw it back in. Another thing, is, when you first use your cream hardener, try to massage the tube so that whatever liquid has separated from the hardening agent inside will mix together. So you massage it like this, then from there you're ready to use your plastic filler. You have your Bondo pan ready. You take out an amount you feel is necessary for your job being done. Only experience will tell you how much to use,

7** (continued)

how much hardener to use, and (you know) when to cut it, when to sand it, like that. First of all you get your plastic filler. Always try to cover your filler so that none of the liquids evaporate, or the air gets into it. Get your cream hardener and read the directions as to how much cream hardener you'll be using. Every cream hardener and plastic filler are used different and you have to use different proportions. Only experience, again, will tell you how much to use. Here you see I put the cream hardener right onto the plastic filler itself. Notice it is a different color from a grey to a red. The cream hardener is red, the plastic filler is grey.

8** What you do is, when you mix the two, you knead it, like bread. You don't mix it in a swirling fashion like this. You knead it, okay? Just like bread. You notice, if you can, that the color is changing, to a pinkish type of color. When the grey and the red mix, it'll turn color, you'll see streaks of dark red inside your plastic filler, you'll see streaks of light grey in it, and until all these streaks come out, you won't-- you'll still have to mix it. In other words, you have to have an even color all the way through your plastic filler. Try to knead in every different direction. You know, sideways, up and down, and even diagonally, if you can. Another thing about plastic filler is that when you're applying, you have to apply it very evenly to your surface. Unless you have a very very deep deep dent which you have fill up, you put a little bit more. So your application is very easy. As long as you make

8** (continued)

it almost even, (you know) it's all right. The rougher it is, when you work on it, the harder it is to cut and to sand. Before you do this step, however, like I said before, make sure the color is even. Otherwise you tend to have soft spots or very very hard spots inside your plastic filler. After you finish applying plastic filler, make sure you clean your tools right away. Or after the plastic filler has hardened a very little. But make sure you keep your tools clean. That way you won't come into any problems later on. Because always-- clean tools will always be the ideal tools. So that's your application.

SERIES A (Part 3)
SERIES B (Parts 9**, 10**)

9** Okay. After you've applied your plastic filler, give it time to set up, okay? Let it harden a very little bit so that you can go in with your Bondo files. At this time I'd like to tell you something about the plastic filler. It's a very hazardous condition you're working in right now. All the dust you create by sanding or cutting the plastic filler goes into the air. There are very fine particles that does go into the air, and it tends to be very hazardous to your health. So try to-- if you do have a particle mask, use a particle mask. It's a white mask, it looks like a surgical mask, just put it over your face and it'll keep the dust from getting out of your lungs. Right how the Bondo is kind of hard, and yet still soft. So

9** (continued)

you go in with your Bondo file. Use it any way you want. Whichever is comfortable for you. The main thing is that at this stage of the plastic filler, you have to shape it properly with your file. Get the proper contour, get it smooth as possible. Work from the outside edge in. Feel whenever possible, and as much as possible. And always try to cross-- cross your cutting, cross-sand. You notice I went in one direction, at the beginning, now I'm going in the opposite direction. That way you create a better contour. Your shape of the Bondo comes out a lot better. Again work from the outside in, and try to work as comfortably as you can. Because if you work very uncomfortably, you'll tend to run into a lot of problems. Because you're not feeling comfortable, therefore your jobs tend to come out a little bit lesser in quality. When you use the Bondo file, try to use (you know) the flattest edge of your file. If it's a half-round file like this, try to use the outside edge. If it's a flat file, you use the whole file.

10** After you-- you feel that it's worth sanding already, the proper contour is achieved from the Bondo file, get your feather-edger here and use whatever grit paper you want, depending upon (you know) how fast you want to cut it, what type of procedure you're gonna do in preparing to paint. I have on this feather-edger here a sixty-grit. Some people will use a thirty-six or a forty to cut very fast, to cut it down very quickly. Some people would use maybe an eighty-grit or a sixty-grit, to cut it down so that it's very smooth. First of

10°° (continued)

all, get-- get the proper air pressure, something you can handle the tool with. You're supposed to control the tool, the tool isn't supposed to control you. Again, start from the outside edge, work inward. Okay, if you notice, while I'm using the machine, a lot of dust is kicked up in the process. That is the dust I've been telling you that is very hazardous to your health. So you know now how much dust is produced, so try to use your mask. Okay, in this process you could also-- say-- cut it with a very rough sandpaper on your feather-edger, and go with a very fine sandpeper with your sanding block. However, I'll just finish up the two with this sandpaper here on the machine. This is what-- (you know) how you would do it in a production shop. You don't-- you try not to use a sanding block (you know) whatsoever. This is a lot faster. This one here is designed to take the place of the sanding block, and therefore, you should use it whenever possible. Again, I'll stress the importance of cross-sanding. Okay. I'm now actually finished with my body work.

UNIT VIII

VIDEO LECTURE

WELDING

SERIES A (Part 1)
SERIES B (Parts 1**-4**)

1** Okay. Today I'll be showing you folks a procedure in autobody repair called welding. Basically welding is more or less two pieces of metal bonded together through the use of-- say-- an oxyacetylene torch setup or arc welding electrical torch setup. Today I'll be showing you basically your oxyacetylene, because most of the shops won't carry your arc-- arc welders, unless (you know) they specialize in the frame repair, or undercarriage of the body. Basically your oxyacetylene torches are used in making patches for rust, welding fenders together, (you know) tears, breakage in your fenders. Also, it's a lot cheaper to use, however it's a lot more dangerous, a lot more hazardous.

2** Basically, your oxyacetylene torches are found (you know) in your shops. They come in maybe containers about this size here. This green container in here would be your oxygen. This smaller container, your silver or often a red or orange, will be your acetylene, okay. Your acetylene is your flammable gas while your oxygen is a non-flammable; however, if concentrated in an area and heated up, it will explode. Basically you also have gauges on your each individual tank which show how much-- how much oxygen you have inside, or how much acetylene you have inside your tanks.

2** (continued)

And then you have another gauge which has smaller numbers, if you notice, which show how much pressure is inside the gas line itself. That would be here for the acetylene, this one for the oxygen. You also have this regulator here which you can release the gas or turn on the gas also. Here, here. Also a main valve you'll turn on before you start anything is this one here at the top of the tank. This one will open up your oxygen, and this one in here will open up your acetylene. Always-- when you work with these, always be careful that you stand away from the regulator itself.

3** The thing that is important also is your torch. You have an acetylene valve which is your red line. You can notice it, it'll be red. You have an oxygen line, which is green. And your oxygen valve. You have your torch setup itself. And a removable torch tip. Comes off very easily and can be put on very easily. Always try to keep the tip in the direction your valves are pointing to. That way you have easier access to your valves with your other hand. Also if you have the valves in this direction, when you move your hand or your wrist in here, you might accidentally move one of the valves. Thus (you know) you offset your mixture. So try to keep the valves away towards-- in the direction of your torch tip.

4** Some other tools you'll be using when you weld will probably be your wire brush here. A striker. This will light

4** (continued)

your torch. A hammer (you know) regular hammer. Your welding goggles. Maybe a tip cleaner for various tip sizes. And then of course the various types of welding and brazing rods you'll be using. You notice I have three types of rods here. One is a welding rod. This is when I weld two similiar metals together. When I weld two similiar metals together I'll use this. I'll have a different technique of welding than these two. These two, these are called brazing rods. One is flux-coated, the other is a regular brazing rod. In welding you have two terms, one will be your welding itself as regular welding, and that would be with your welding rod. And then you have another term called brazing, which you use the bronze, your brass, your brass rods or your brazing rods. Both of them you heat up the metal differently. You use the torch similar. However, your panel and-- your panel and the type of repair you're doing will be different. Most times you'll probably be using your brazing rods to put patches onto rust, such as galvanized sheet metal onto your regular 22-gauge metal fenders. However, when you weld fenders, tears in your fenders, you'll probably be using your welding rods, your steel rods. So, that's basically an outline of what welding would be like.

SERIES A (Part 2)
SERIES B (Parts 5**-10**)

5** Okay. To introduce you a little bit more into your welding, before I start actual welding, would be your safety.

5** (continued)

In the safety, you don't have to remember very much. Just have to remember to wear your goggles, protect your eyes from any sparks flying from the weld[illegible] area. Also it's to protect your eyes from getting blind, from getting burned. Because these lenses are treated, they're dark, dark lenses. They're darker than your regular sunglasses. They protect your eye a lot better. Another thing is, when you work with your torch, instead of using a lighter, a regular cigerette lighter, try to use your striker. Your striker pro[illegible]es only the spark to light the torch. It doesn't produce a gas and a spark, which your lighter does. So try to use only your striker.

6** Another thing is, on your acetylene tanks and your oxygen tanks, when you turn them on, try to face away from this regulator itself, turning on, because on the regulator itself, it's joined right inside here. If anything happens where you turn on your regulator, turn on the gas from the tank, the joint may be faulty or it'll just break. And because due to the pressure of the gas. So this whole thing might rip off. So you have to watch a way-- watch that. Always stand away from it in back of the tank if possible, or off (you know) to the side. The same with your oxygen tank. The same procedure. Another thing is, after using each of your torches, turn off the regulator itself, turn off the pressure of the tank, and also release all gas which is in the oxygen or the acetylene line of the torch itself. I'll show you all that after I complete (you know) today's lesson. Your acetylene

6** (continued)

gas is very toxic. Don't breathe it. What ever you do, don't breathe it. It'll-- it'll kill you. It's also very flammable, so if you have any leaks in your tank, your regulator, your hose, or your torch, get it repaired right away. Otherwise you might have a-- if you do have a leak, somebody might happen to light a cigarette, and (you know) blow up, the whole place might go. Your oxygen, like I said before (you know) is not a flammable gas when it's coming out of the torch. However, if you concentrate it in an area such as maybe a balloon with oxygen, light it, it'll go. If it's concentrated enough, it'll go. So oxygen, although it's non-flammable (you know), it'll explode if concentrated.

7** So to get into welding itself now, basically, all this is turned off right now. My whole setup is turned off. I'll turn on the oxygen first. Try to stay away from your regulator itself. Turn it on. Try to open it all the way. All the way. This is so that if there's any leak in here, your oxygen won't be coming up and being wasted. Some people will tell you only a quarter-turn is sufficient. If they tell you that, your boss tells you that, tell you a quarter-turn is sufficient, do it his way. Do it his way. When you become your own boss, do it yours. However, this way you avoid any leak in your oxygen tank. Your acetylene tank, however, is quite different. This tank, only a quarter-turn, only a quarter-turn. A quarter-turn is sufficient. Then if you can see, each of the dials are reading how much-- how much gas is

7** (continued)

left in the tank. See that here. Now for your adjustments-- how much gas pressure you want in the line. Use the regulator itself. On your oxygen it should be about ten. On your acetylene it should be five. You could go-- on your mixture itself, in your line, you could go any (you know) say-- twenty and ten, or five and three. As long as your acetylene is half of that of the oxygen. That's all you have to remember, okay? However, ten and five is the best. Right now, all you have to do now is your torch.

8** Basically you open your acetylene first. Very slight. And you notice you have a very small flame with a lot of smoke, a black smoke, soot, if you can see it. And as you turn it up, (you know) it feathers a lot more. A little less smoke, and a bluish tone of color close to the tip. You can have it very strong like this, and you notice that the blue tone or blue color is away or off the tip itself. You shouldn't have it like that, okay? Always try to keep it on the tip, and a very well-feathered flame. Next you open your oxygen very slowly. You open it too fast, the chances of burning your acetylene flame out is much greater. So you turn it on very slow. You'll notice, you'll start noticing the difference as I turn on the oxygen. This is what they call an ideal flame. There's one cone in the middle of the whole flame itself. You have too much oxygen, there'll be a hissing sound, and the cone of your flame becomes a lot sharper. You have too little oxygen in your mixture, it'll

8** (continued)

be a white flame, and very long, and you have maybe two separate cones in the middle. You have two separate cones. So like I said before, your ideal flame. This is too much oxygen. And too little bit of oxygen. When you turn off your torch, turn off your oxygen first, then your acetylene.

9**. And right now, I'll get into something you all been waiting for, and that's your welding, actual welding. First of all, when you weld, you have to have a clean area, very clean area. Grind it down to bare metal. For the first demonstration, I'll use a steel rod which is used to weld two similiar metals together. If you have-- say-- a tear in your fender, maybe a tear here, you're gonna weld it up, and it'll be one piece again. So that's your purpose of your steel rod-- to weld two similar metals together, or your steel-- your fender. Remember again, your goggles, and your striker here, and you keep your hammer here (you know) in order to pound your weld down. You have the hammer so that you can pound the weld down so that afterwards you can grind your weld, and then put your-- your Bondo over it, your plastic filler. You'll also use your wire brush to keep the area clean during the welding process. And also try to have a bucket of water with a rag in it so that-- say-- if you put too much heat onto your panel itself you have the water to quench the area. Another thing I'd like to say before I start is that when you do weld, watch your heat-- how much heat you're putting onto your panel. Because you put too

9** (continued)

much heat onto your panel, the more chance of your panel warping. By that I mean it'll get out of shape (you know) because of the heat.

10** In welding, your steel-- steel rod welding, you heat up the panel so that you get a molten-- molten puddle. Very liquid state of your metal. From there you introduce your steel rod into this puddle, and you make what is called your bead. You use your neutral flame for this, and then you concentrate the heat in one area. You hold your torch in either your right or your left hand, whichever is comfortable, and your rod in the opposite hand. When you put your torch onto the panel itself, it should be about forty-five degree angle. That way the heat will travel towards the direction you want to weld. Say I want to weld towards my left, it'll be forty-five degrees, and the heat'll be going towards my left. So steel rod, you look for-- you create the puddle, and you start putting your steel rod into this puddle, and move along. This, in this procedure, try to watch your puddle very carefully. Also, it'll spark a lot, it'll pop a lot. You have to (you know) just bear it. If it gets on your clothes and starts burning, put it out right away. So this would be your steel welding. Your steel welding is very simple after practice. It'll take a lot of practice because (you know) you don't often get this type of bead, if you can see it. Usually you have a lot of metal on the side, it's not concentrated in your regular bead area. Try and notice

10** (continued)

something like this compared to something like this. You'll notice in this other weld, on this other bead, it's very uneven. You have a lot of steel on the side which looks very ugly. Looks like chicken-shit, yeah? That's what they call it, chicken-shit. You have a very ugly bead, that's what they call it. Try to always keep your bead very even, very nice, something in this fashion. So that would be your steel-rod welding.

SERIES A (Part 3)
SERIES B (Parts 11**-17**)

11** Okay. To give you a better idea of what the-- each bead looks like, (you know) this one here would be your good one. This here would be (you know) your chicken-shit, or (you know) a bad weld, a very bad weld. Then, now I just-- after I've seen these beads, show you the various movement involved with the torch itself, and with the rod. When using the-- the rod, whether it be brass or whether it be steel. First of all you put (you know) your torch in the hand you feel most comfortable with, and then you go in close with your torch. Try to let the cone, that cone I was talking about, (you know) touch the metal itself. Let that inner cone touch the metal itself, and work in a small, very minute circular motion. From here when you see your puddle forming, in here. And you keep moving down the line. It'll take a lot of practice in order to get your coordination. However, (you know) you'll

11** (continued)

get it (you know), sooner or later you'll get it. So always remember a circular movement and your dipping.

12** Another type of welding I'll tell you about is brazing. Brazing. You have two different types of rods. One is a lot more convenient than the other. The only reason why you have two is the convenience involved. One, you notice, has the rod inside a white coating, a white shell. This white shell is called your flux. Inside, you notice you have your brazing rod itself. On the other hand, you have your regular brazing rod here, your brass rod, and a can of flux, which you dip your brazing rod while it's hot into the flux, and it'll become flux-coated, your tip will become flux-coated. I'll demonstrate to you each way, and then show you basically (you know) how to use your hammer, how to use the wire brush, and your water. First of all I'll show you without-- the brazing rod without the flux. Most shops (you know) might have this, this type of rod and the flux can because it's a lot cheaper.

13** This time, when you go with brazing, you don't create a molten puddle. What you do is you just heat the metal up to maybe a dull red, or a pretty close to a cherry red. Keep the same flame throughout all your procedures, whether it be steel or brass. The same neutral flame. Always have your can of flux very close to you. Keep your wire brush and your hammer here. And then your can of or your bucket of water. Always have that near you. To coat your rod with the flux, heat up the tip with your torch. Doesn't need very much

13** (continued)

heating. Put it into your flux can and it becomes flux-coated. Another thing is, as when you're brazing, and when the flux runs out, dip it again. Always keep the flux onto your rod. Your flux has a purpose of keeping the area you're brazing chemically clean. Right now it's only physically clean, so you need the flux to keep it chemically clean.

14** Watch the hand movement, and if you can, try to watch how the metal is heated up. Try and look at this weld-- how to practice on this. This is very big. You don't want that much braze going onto your body. It's very inconvenient while you-- when you grind it or when you hammer it with your hammer. If it's too high (you know) when you hammer. Just basically, (you know) try to keep it very small and very thin, like your welding rod. So your hammer is used to counter-sink your braze or your weld. Your wire brush is used to clean the area. Again. And now I'll show you basically what the better weld is--what your better brazing bead is. Hopefully. If you can see it, you notice it's a lot more even than the one above it. This is a lot better bead, a lot more uniform and even.

15** Basically, when you weld or braze, you don't make these this continuous. Maybe you start something small like this, or maybe one spot all around. And then from there you stitch, go a little bit longer, and then from there you complete the stitch by a continuous weld. You have to remember not to

15** (continued)

concentrate the heat too much in one area, because like I said it will warp, warp your panel. Right now I'll show you what I mean when I make tacking, stitching, and then a continuous. I'll be using a flux-coated rod now, and then I'll be using the hammer, the wire brush, and the water to show you (you know) a proper way of doing things. First of all your tack weld. This is to keep the two--two separate sheet metals, two separate pieces of metal (you know) onto the body itself. So you go in with a tack first. Something like this. Very small. As flat as possible. Hammer it down a little bit. Quench it. Keep the heat to a bare minimum. And then--your wire brush. From there you go to the next spot, which would be (you know) as far away as possible from your first tack. Very simple. Most times you won't even be using the hammer or the wire brush or the water as often as I am doing right now. However, if you want, keep the proper, most efficient, best quality way of welding or brazing, that would be it.

16** Notice this is your tack weld. You should-- you should try to keep it all even in size. You should keep it as flat as possible. And then from there you could stitch, stitch weld, which I'll show you, or you could leave it like this, depending upon what the boss wants, okay? Right now I'll show you how to stitch. What I mean by stitching. Another thing to remember is that when you're welding or brazing, if

16** (continued)

your metal becomes too hot, turn the flame up towards your rod away from the sheet metal, onto the rod. Try not to burn yourself. Very sore. You leave a nice scar if you do. So this is your stitch welding. You stitch only in certain areas. From here make it continuous. A continuous braze now. Notice that the panel does get very very hot, so try to keep it cool whenever possible. Try to always quench. And that's your continuous braze starting from your tack. Hopefully I've told you what I could (you know) and like, this isn't all there is to welding, okay, there's a lot more. There's a lot more in the technique used, there's a lot more into the various ways you're gonna put two metals together. From there you're gonna just have to learn either through experience through a shop, through school, or maybe even at home. Also, if you can, try to read up on it.

17** When turning off your torch, turn off your-- oh, turn off your oxygen first. And then your acetylene. What I just did was I turned the oxygen more and it burned out the flame. Make sure your valves are all off. Go to your tanks. Turn your acetylene tank off first, because it's the more flammable. Then you turn off your oxygen tank. Go back to your torch. Open your acetylene tank-- open your acetylene valve, I mean to say. And try and watch your needles go down. When it goes down, turn it off and open up the regulator. Most people will tell you don't even bother, just

17** (continued)

turn off the tanks and let it go. It's a lot more economical that way. It might be a lot more efficient also. Next, your oxygen valve. Open it up again and let the oxygen come out. After that, turn off your oxygen valve, release the regulator, and that's it for your welding.

UNIT IX

VIDEO LECTURE

THE SPRAY GUN

SERIES A (Part I)
SERIES B (Parts 1**, 2**)

1** Okay, you see here I have a spray gun, okay? This is a very important tool in your body and fender shop. Right now I'll just like to take the time out to say that-- yep, we're getting away from body and fender work and we're going into painting. Lot of painting to be talked about, and to start it all off, talk about the spray gun. Well, in your body-fender shops you have your spray gun and it's the most-- one of the most important tools in your body and fender shop because it's putting out the paint jobs that the people see. Body work not too many people see so they don't really diagnose it as much as (you know) your painting. The painting, you notice they look at the side, how glossy it is, they feel it, how smooth the finish is, and they see if the color's all even all around. So your paint gun is what's producing a good job or your junk job. And in your body shop you probably find three types of guns. One would be your primer gun. It's a very dirty-looking gun, one that's not taken care of, maybe just shot out with thinner once in a while and filled up again with primer, okay? And then you have your very clean guns-- your lacquer guns, and you have your enamel guns, that do the complete paint jobs, and your lacquer guns, which do the spot painting, or touch-ups. And basically, those are kept clean. They're-- they should--

1** (continued)

they should be spotless, so if you own a gun, try to keep it very clean. If you can see my gun here, this is my own, and I try to keep it very nice, try to keep it shiny when possible, keep moisture out of the inside, (you know) just make sure only paint is getting in. Just try keep it spotless.

2** Basically again, you have three manufacturers of guns which are very reputable, which back their products up very well and have a lot of parts in case your gun breaks down, and have places where you can send your gun for servicing. So (you know) try to go with the big names, and those big names would be Binks, one would be Binks, the other would be DeVillbus, and a gun here I have, Sharpe. Three basic manufacturers, all of them very well. In your body shop you notice that maybe your old-timers, okay, will go with the older models of Binks or DeVillbus. And if you notice, people coming up Honolulu Community College, they're coming out with Sharpes. That's because the salesman comes down. But after using a Sharpe model, you find that it is a very good gun, and it's very comparable to your Binks or DeVillbus. And it's also about the same price also. So, it's a good gun. So when you go to buy a gun, make sure you get one that's from a reputable corporation, and when you use it for paints, keep it clean.

SERIES A (Part 2)
SERIES B (Parts 3**, 4**)

3** Okay, getting back to the spray gun, I'd just like to get you to know what-- what the spray gun is, okay, the various parts and the different types of adjustments you'll be making. To start off, this is your spray gun. And the cup. Spray gun here, and your cup. Your cup is basically used to carry your paint, (you know) this holds-- to hold the paint, and from here the gun will suck it up, spray it onto your surface. That's your gun, I mean your cup. Now for your gun. Going down to basics. This is your handle, right here, this is where you hold it, put your hand in over here, put your finger over the trigger here, and from here you spray. Just pull the trigger, a little bit of air comes out and then your paint. Also, besides your gun handle there, your trigger, you have your air cap here with the horns, air horns in here. Notice that you have holes on each of these horns, on the inside, if you can see it there. And also on the front surface-- front face here. This would be your air cap. Here on your gun you have your head, head of your paint gun. This is also removable, you have to remove this once in a while to overhaul your paint gun. Also to keep your paint gun in top condition.

4** Besides this (you know) you have your adjustments, such as your fan control here, your top-- top knob here is your fan or pattern adjustment. Here you have your fluid adjustment or how much paint will be coming out of your gun. So this would be your fluid adjustment, and here you have an air pressure gauge-- not

4** (continued)

gauge, but air pressure knob. This controls how much air is going into your gun at one time. And this determines, (you know) how much paint will go on top of the surface, or how much will go inside the atmosphere, or the air you breathe. Another thing about this gun, it has, if you can see, a white gauge in here. If you see it and notice right over here. There's a gauge, and this shows how much pounds of pressure you have coming into the gun. Say-- you have ten pounds of air pressure, maybe fifty, sixty, even seventy-five pounds of air pressure going into your gun. This-- this gauge here tells you how much, and also it'll-- you know how much air pressure to shoot your paints at. Like for your-- your different types of paints you have different types of air pressure you should shoot. This is a very helpful item. Also on the Sharpe models of guns, you probably won't find it on your DeVillbus or your Binks, is inside the cup you have a no-drip spout. This here prevents the paint from going out of the hole, the air hole that's at the top of the cap in here. And from there you don't waste paint. Paint doesn't spill onto your hand when you're upside down spraying or sidewards painting, you don't lose any paint from that hold. That's how come the no-drip is a very unique item on the Sharpe models. That's how come a lot of people are going for Sharpe guns.

SERIES A (Part 3)
SERIES B (Parts 5**, 6**)

5** Going back to the adjustments, the adjustments are your very most important parts of your gun. They have to be working very well, in order for you to create a good paint job, very high gloss, and very smooth finish. First of all your fan. Your fan adjustment, well, that's how much-- how wide your spray will be coming out of your gun. Could be from maybe-- half-inch, half-inch wide all the way up to maybe about six inches, seven inches wide. That's your fan adjustment, you can make it small to very large. Your fluid adjustment. Your fluid is how much paint you want coming out of your cup into your gun and onto the surface. How much-- (you know) if you want a lot of paint, you open up the fluid. Turn it on just like, okay. If you want a little bit of paint coming out, turn it off or close the valve, close the adustment. Next thing would be your air-- air pressure knob here. This is to adjust how-- how much air you want going into the gun. If you want high pressure, that means you're gonna be spraying a lot of paint. Gonna be spraying a lot of paint which will go onto a large surface. You turn down the air pressure, you're-- it means you're shooting a little less paint and-- for a smaller area. If you have a high pressure, with little bit paint, (you know) the paint will naturally go into the atmosphere because the air is breaking up the paint particles and going into the air instead of onto your surface. So your-- your fluid adjustment and your air adjustment are very important. They work together, and when

5** (continued)

you adjust one you have to adjust the other.

6** Another thing to talk about is the position of these horns on your air-- air cap. If it's on the side like this, your fan will be spraying up and down, or hor-- vertical. If you turn it this way, your horns up and down, your fan will be horizontal, or side to side. So always remember like-- if you've got to spray up and down, keep your air cap in this position here. Opposite. The horns have to be opposite that of the pattern. So if it's like this, you know it's horizontal, if it's on the side it'll be vertical. When you spray up and down, put-- put the horns up and down. When you're going to spray side to side, put the horns side to side. Very simple, okay? Another thing is that when you do spray with your gun, try to adjust the fan properly, so that you can get a very good overlap of your paint. You make one stroke of your paint onto your panel, and you try to overlap that, or try to cover half-way of that coat. So you spray one-- one stroke on, go half-way down and spray another one, half-way down, spray another one, and then you'll probably-- you'll get to see it later on when I show you paint preparation, and actual painting. So basically that is your spray gun, it's very simple to operate. If you can get a hold of one, try it out. Get the feel, try to place your hand on it very comfortably, find the position where (you know) you can grab the gun and feel very comfortable with it. And you'll like it. It's a good feeling to have a good spray gun in your hand, and doing good jobs.

UNIT X

VIDEO LECTURE

INTRODUCTION TO PAINTING

SERIES A (Part 1)
SERIES B (Parts 1**-3**)

1** Okay. Basically there's two types of paint jobs, and if you can see it on the board, these are the two. You have your touch-up painting, which is your spot painting or your paint job that is confined to a small area, or to one side of a car or (you know) a very small spot. Your complete job, however, is painting the entire car, and therefore you have one solid base of paint on your car. It's complete. The word-- paint job, here, complete-- means what it says. As for the types of paints you use, you'll notice that you do use all the same types of paints in both jobs. However, you have your preferences. In your touch-up jobs, you usually will go with your acrylic lacquer first. Second, if you do touch-up (you know) without using the acrylic lacquer, you can go with your acrylic enamel. And if you don't like your acrylic enamel, you can touch-up with your synthetic enamel. So all the paint here (you know) is labeled one, two, and three to show you the preference. Again, in your completes, the same thing. However, first of all, the first type of paint job you'll be using would be an acrylic enamel. Next in your complete, you would go with a synthetic enamel. Third, you go with your acrylic lacquer. The reason why you have these preferences is the time involved, and the work involved.

2** In your touch-ups you have a very small area. You want the car to go out very quickly. Your acrylic lacquer dries fast. It involves less time, and a little bit less work also. This is where your money is involved, your time and your work. And your touch-up, this is the one that brings in the most money for the shop, and it keeps the shop moving all the time. New cars coming in and out, in and out. Whereas your completes, one car sits in there for quite a while (you know), maybe two days to maybe a couple weeks, maybe even a month, depending upon the type of work to be done and how much there is to be done. So basically your acrylic lacquer is used for your touch-up because it dries faster, and you move the car out. In your complete jobs, your acrylic enamel, for this type of paint, it will dry in about-- say-- two to three hours, and you can take it out of the spray booth and from there you have no buffing to do, as you have to do with lacquer, you have no compounding to do, as you do with lacquer, and it has a very high gloss itself. That's (you know) the reason why they go with complete-- on the completes they'll go with the enamels, because after it's sprayed on the gloss is there, it's very high gloss, you don't have to work on it after you paint the car. From there you just clean up and you send it out. You gotta think about your time, you gotta think about the work.

3** As for your touch-ups, your acrylic enamel, if you use your acrylic or your synthetic enamel, all you do is spray it on also. However, you use a very large area to spray. You don't confine it like your lacquer. Therefore it takes a lot longer,

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3** (continued)

also the drying time is also longer. However, after you spray it, the gloss is there. So you can use your enamel for touch-up. In your complete, your enamels are used first for your gloss, and then your lacquer. Your lacquer, usually, is a lot more work though, because you have to spray so many different coats. Like there's painters that spray maybe five coats, complete. There's some that shoot twenty, there's some that shoot forty and so on, you know. It depends upon what kind of paint job you want. And your acrylic lacquer, you really gotta work. You gotta work, you gotta sand the car between so many coats, you gotta buff it out with compound, you have to really use a lot of elbow grease, you got to put a lot of work into it. That's how come it's at the bottom of the list down here. It'll take too long and probably the only type of lacquer job you'll be doing for completes might be a custom car, something that's gonna go to a car show, or maybe even your own car, or somebody that's gonna pay you the price for doing acrylic lacquer. So basically, that's your two types of jobs, and I'll be basically telling you more about your complete jobs today.

SERIES A (Part 2)
SERIES B (Parts 4**-8**)

4** In your paint shop you'll notice that you will have more touch-ups than your completes, and you'll find that (you know) your complete jobs tend to be a little bit more satisfying because of the amount of body work usually needed.

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67

4** (continued)

When you do a complete paint job, usually you'll be doing complete body work. And here you see on the board is basically the steps you'll be using for preparing the car before you put it into the paint booth. Your paint booth is where you do your actual spraying of the car, and-- and finishing off (you know) the car. First of all, do the body work. That-- that is your base, your foundation, of everything. Your body work has to be good if you want to have a good job done. If you do your body work bad, your car will look bad. If you do your body work good, you'll look like a champ. Second of all, you prepare your body work for your painting. That means you feather-edge, you go into glazing putty and priming. Which will be talked about later on, (you know) in another lesson.

5** After you prepare your body work, you have a final coat of primer on all your body work, you go into the preparation of the whole car. What I mean by this is that the whole car is taken as one unit and not individual spots like your body work, preparing your body work. So like on this, before you start anything, you wipe down the whole car with a cleaning agent, maybe a degreaser which will take off all the wax, dirt, and around the windows usually (you know) you have deposits of silicone or (you know) that-- other types of polish (you know) you use on the car or on the chrome, in the door edges, like that. So you wipe it down first with a degreaser. For one product, the Acme product, it's called Klix. In DuPont it's called Prep Sol, it's just a solvent you use. However, in a lot

5** (continued)

of body shops you might not be using that, so find out about it.

6** After you wipe it down, you go into sanding the whole car. In sanding you use maybe a three sixty-grit sandpaper, wet sandpaper. You could go with even a four hundred, could go with a five hundred, and you could go with a six hundred. That's for complete sanding of the car. The regular-- the original paint and your primer, you sand everything. And when you do sand, try to sand all in one direction. Most times you'll be sanding forward to back on your cars, not up and down. Forward and back. The reason why you sand in one direction is that so you have just like a grain for your car. When your paint goes on, it looks like wood. If any of the scratches show, if any of the sand scratches show, it'll be going in one direction, and it'll be uniform and very unnoticeable. So it'll be like your grains in the wood, and so, try to sand in one direction. Otherwise, if you do sand in opposite directions, or crisscrossing, or in circles, if the sand scratches do show, it will (you know) look very awkward on the car. After you go into sanding, you dry the car off (you know). If you water-sand you dry the car off, if you dry sand, you blow the car down and you prepare it for masking.

7** Masking is a procedure where you're using tape, probably a production paper, which is a very thick type of paper used to covering the windows, your bumpers, and any other chrome that's very large. Instead of production paper, some shops will be using newspaper. It's a lot cheaper. It's free. Everybody

7** (continued)

gets a paper at home. What do you do with a paper after you read it, yeah, throw it away? All you gotta do is collect it from your friend, you have your paper right there. Production paper you have to buy. You have to buy, and (you know) it's quite expensive, and they do come in different sizes for different types of jobs. Your masking involves taping up all your chrome on the car, and it's used so that whatever you don't want painted, you cover it up with tape, your paper, and from there you can paint the whole car without any restriction whatsoever. After you mask the car up, you check it out, check the whole thing over, see if there's anything else to be done about body work, check your taping, if you put the tape on the body, put it onto the chrome, take it off and put it onto the chrome, (you know) it's not supposed to be on the body. Look at all your seams, see if you got dirt, all the dirt out, try to get all the dirt out, and (you know) it's just like an inspection. You inspect the car before it goes into the paint booth so that if there's anything to be done you can catch it right there. Because after the paint goes on it's too late, can't fix it.

8** After you mask, after you've inspected, you go into a final blow-down, or with your air gun you blow out all the seams in the car for all the dust. You remove all dust because if there's any dust on the car when you're painting, you see it very very distinctly. Lot of specks on the car all over, and it looks dirty, it looks like a dirty job because it looks like the specks of dirt on it, and just the paint's covering it. So what you

9** (continued)

have to do is blow down all the seams, around your chrome, your windshield, inside your engine compartment. inside the trunk, under the tires, inside the tire openings, inside your doors, and try to do a good job. That way (you know) your dust won't-- won't hinder your paint job and again, you'll come out looking like a champ. Again, basically your paint job will be very important. Your-- this procedure right here, your blow-down, is very important in your paint job. It's very very necessary. And then after that you send it into the paint booth.

SERIES A (Part 3)
SERIES B (Parts 9**-11**)

9** Okay. After you've blown down the car and then have inspected the whole car for anything that is out of the ordinary, you're ready to paint. What you do is before that you prepare your spray booth. And what you do is you wet down with water (you know) the outside of the spray booth and inside the spray booth. This is used so that (you know) you minimize (you know) the dust. The effects of dust. Try to wet down the whole area, and as large an area as possible. After you've done this, you bring your car into your spray booth very very carefully, okay, try not to get it dinged up (you know) any more. You want to paint it, you want to get the car out. So you don't want to damage the car any more. So bring the car in very safely, have somebody guide you in if possible, and then after you've brought your car into the spray booth, cover the tires. Usually there's tire covers inside the paint booth already which you use over

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9** (continued)

and over. Put those on, cover the tires, and then go into blowing down your car like you did before. Inside the various seams, openings around the molding, windshield. Make sure you do this also, do it very well.

10** After you've done that, you go into tacking the car. What you do is you have a varnish-soaked rag which resembles like a gauze, a piece of gauze, a sheet of gauze, and it's soaked in varnish, and what it is, it's used to wipe the car with so it picks up any dust that is left from the blowing down. From the blowing-down procedure. After that you try to bleed your transformer. What this means is there's a unit which is connected to the line which is connected directly to your compressor, and what this does-- your transformer-- is it catches any type of rubbish, any water or any oil which is coming directly from the compressor. And from there it catches all this and your line which is connected to your tool or your spray gun is kept clean. If this transformer is too full, that rubbish-- water or that oil-- will go into your line, and into your tool or spray gun, and you don't want that. So what you do is you bleed it. Open up that bottom of the transformer, let all the water and that oil drip out.

11** From there, try to go into your mixing your paint. What you do is-- depending upon which paint you use, it depends upon how you thin it out. You can either use your lacquer thinner or your enamel reducer. If you're gonna paint the complete car with lacquer, the acrylic lacquer, you'll thin it

11** (continued)

down with a solvent called lacquer thinner. If you spray your car with enamel, either synthetic enamel or your acrylic, you'll go with a solvent which is not as strong as your thinner, and it's called your reducer. Your mixture of each of these paints depends upon the painter himself, and it depends upon the instructions which are found on the can. And also through experience, okay? Sometimes they'll tell you so-much-percent to so-much-percent reduction. And (you know) some people would reduce it less, some people would reduce it more. Or thin it down less, or thin it down more.

12** From there, what you do is (you know) you get your gun ready, you check your air pressure, some paints will tell you to have fifty-five pounds air pressure at the gun, some forty, forty-five, even thirty-five pounds air pressure, depending. Also your technique, of course, will go as follows (you know) inside your paint booth. Some people will spray the whole side of the car, if they can, at one time. Some will go maybe-- cut it off at one panel, spray this panel here, then go to the next panel here, go to the hood, go to the roof, and spray it panel by panel. Some people will take two panels, some, again, the whole side of the car. It depends upon how you learn, what (you know)- how fast you want to go, and the type of paints you're using. How fast it's drying, how fast (you know) everything is working out.

13** If you notice, the paint booth will have a fan, probably in the back or in the front, and the position of the fan is-- will

81

13** (continued)

determine where you start painting your car. If you notice here, the fan will probably be in this corner, and your position of the car here, either (you know) forwarded in here, or backed up like this. On this, common sense hopefully will tell you to start at this end, right here. And work your way towards the back of the car. The reason for this is that what you want to do is spray the car here--if there's any over-spray going into the air, it'll be caught by the fan, pulled into the fan and out of the booth. As you work towards your back, it'll be doing that. Say if you were spraying back here and the over-spray going into the air and sucked out. This way you get the over-spray on the part of the car you're going to paint, and the over-spray will be caught into the fan and not on the places you have already painted. So technique will be determined through experience and from where you learn, how fast you want to work, and (you know) how well you want to work. So painting (you know) is important, lot of steps, lots of work.

UNIT XI

VIDEO LECTURE

PREPARATION FOR PAINTING

SERIES A (Part 1)
SERIES B (Parts 1**,2**)

1** Today I'll be showing you how to use the spray gun in a procedure in autobody repair that's called preparing for paint. In preparing for paint, it's a very important step in order to create a good paint job. The preparation in painting is your base, and your base has to be good in order for you to have a good top. Just like a building, you have to have a good foundation in order to have a good strong building. Preparing for paint involves some power tools, a lot of your hand tools, and it takes up a little bit--a little bit of time. You have to let things set, you have to apply things, you have to use different things, different items, sandpaper, your tools. I'll tell you about how to do it a good way, I'll tell you how to do it a shop way. There is a big difference, one takes a lot of time, one takes a shorter amount of time so that you can produce a lot, work on a lot of cars and send it out right away. That's your production way.

2** Before I start, before I show you, I'll tell you about the feather-edger. This is the--one of the power tools you'll be using. This is also called an orbital sander or a dual-action sander, but most times you'll probably hear it called as a feather-edger. This is your trigger in here. You have a place

2** (continued)

also to adjust air pressure. And you have your backing pad and your sandpaper. That's your dual-action or your feather-edger. Another two items you'll be using while doing the preparing will be either your putty knife or your squee-gees. You use either/or in order to apply glazing putty. This here would be your glazing putty. It's only one type of glazing putty that you have on the market. You have several different brands. However, for me I like to use the 3-M brand, the spot green putty here. It's very fast-drying, it's very easy to work with. Another tool is your sanding block, for hand-sanding your glazing putty. Either you wet-sand or you dry-sand your glazing putty using your sanding block. The last thing you'll probably be using while preparing for paint will be your primer gun. Notice your primer gun is the dirty gun. It's-- it's got stains all over it, primer dripping from the cup all over the place. However, it works like your regular paint gun. You have your fan adjustment, you have your fluid adjustment, your air adjustment, your trigger. So these tools are all needed for preparing for paint.

SERIES A (Part 2)
SERIES B (Parts 3**-7**)

3** Okay, before starting your preparing for paint, you have your surface to be prepared, right. In order to do it right, what you do is you have to feather-edge the outside edge. Remember feather-edging is creating from a slight step from the paint and the metal to a very even, smooth surface. That's your feather-edging. In order to create that feather-edge, in order to create the feather-edge, you have to use your orbital sander or your feather-edger. This one here is air operated. I'll be using a two hundred twenty-grit sandpaper to do the feather-edging. Try and watch also how the edge comes out from-- from a very rough edge to a smooth edge. Try to feel the surface every once in a while, make sure that the metal isn't getting hot, that way you have less chance of warping your metal. Also try to hold the feather-edger or the dual-action as flat as possible on the surface. That way you're sure of a flatter, more even surface or feather-edge.

4** Okay, your next step in-- after your feather-edge, is to prime. You have your ways of priming, you have your production way, you have a good way. Want that all (you know) to be a good job. First of all, your production way, you're just laying the primer on. Paint it on real thick, real wet. However, if you want to do it right, do it a way where your first coat of primer is transparent. Where you just have a transparent coat of primer so that you can see right through it. You go over it with a second coat which is a little bit wet and yet still transparent.

4** (continued)

Then you go over it with a third, wet coat. Usually you'd primer like that if you do it on your own car. However, for production, you'll probably just shoot probably two wet coats and apply your putty.

5** You remember your adjustments on your gun. Your fan, depending upon how wide you want it. Your fluid, how much you want coming out of the gun. And your air pressure. How fast you want it coming out, how much you want going on. So you first prime, try and watch-- watch the way the primer is going onto the-- onto the panel itself, watch how I overlap each stroke, and watch how-- how wet or how dry the primer is going on. Okay, this would be your first coat. Basically it's a transparent coat, very transparent, if you can see it. Your second coat will be similar. Try and watch the stroke, it's going to be fifty-percent overlap. The second coat I can still see through it, and I'll probably go over it with a third coat, a wet coat, and then apply my putty, my glazing putty. This will be your wet coat, third coat. You notice that when the primer goes on it's very wet. In order to shoot another coat on top of that, you have to let the wet-- wet spot or the primer-- flash. What I mean is this wet spot has to turn dull in order for you to shoot another coat of primer on it. Otherwise you'd have a very soft bottom, and a very hard top, and the thinner or the solvents inside your primer won't have the chance to evaporate. After you do that, you let your primer set for a while, and then you can apply your glazing putty.

6** The primer has to set yet, before I can put the putty on. Otherwise if I were to put the putty on while the primer is wet, it'll probably run, and then it'll come off. The primer will come off when I apply the putty, because the bottom, like I said, is not-- not dry yet. You have to let it flash a while, have to let the primer sit. It's so important. You gotta have a good base. A lot of people when they use the primer, a lot of them can feel basically when it's dry and (you know) if it's still wet, still evaporating. What they do is they put their hand right over the area very close yet not touching. If they can feel a cold type of breeze coming through the primer, it's still wet (you know) the-- the solvents are still evaporating. However, when you come to touch it, and it's not that cold, you're able to apply your putty.

7** The purpose of your glazing putty is basically to fill scratches that are left by your grinder or your rough sandpaper, and even to fill very small dents inside your metal. However, you don't use the glazing putty like Bondo. You don't fill up dents with this, okay? Fill up only small scratches that are left by the grinder or your sandpaper and small indentations or imperfections in your metal. Don't abuse the putty because too much putty will crack after you paint it. It's about time that you can apply your putty. I'll show you two ways, that's one with the putty knife and one with the squee-gee. Your first application of putty should be, like your primer, transparent. It's a very thin coat, and again, like your primer, try to let it sit for a while. Let it flash. You notice that when you work with your putty, it goes on very wet. You can tell the difference between

7** (continued)

the various coats. Let it flash for a while, and then go over it with your second coat. Now I'll use a squee-gee. Notice again you also have to overlap each of your strokes of glazing putty to make sure you cover the area very well. After this you let it sit for a while, and then you can come back to sand it down, and then re-prime, and do a procedure called spot-puttying.

SERIES A (Part 3)
SERIES B (Parts 8**-13**)

8** And now I'll show you basically how to sand the glazing putty. When you start off you have your grit of sandpaper on your sanding block. This would probably be a one fifty, equal to a one fifty. This is also fre-cut, or dry sanding. Could also sand glazing putty with water using a wet sandpaper and you could do it dry, again. If you're going for production, you start out with a very rough sandpaper first, and then you finish off with a very smooth sandpaper. That way you sand it one time, and that's it. Whereas at home you probably might want to sand fine-- use the fine sandpaper all the way through. So basically when you sand the glazing putty for production use a very rough grit, and you finish off (you know) with a very fine grit.

9** When you start off, you start off at the outside edge, and work your way inside, toward the middle of the repaired area. For me, the way I do it is, on the edge, I go circular, I use a circular movement with the sanding block to get that real smooth edge, and then I cross-sand in the center to create a good

9** (continued)

smooth surface and a very nice even job. Basically on the outside, go in a circular movement, get my edge. And then, as I get towards the middle, I cross-sand. Okay, what I'll be doing is I'll be using this rough sandpaper and-- and just finishing it up with the rough sandpaper, and I'm not gonna be showing you (you know) the procedure of using the fine sandpaper over this area because the procedure is the same. Say that after you've rough sanded like this, it all with the rough sandpaper, you've made the whole area very smooth, very nice, a very good job, you can-- you just go over it again with the sanding block, with a finer grit. I'll be showing you a different method. Usually for production, you'll use a fine grit paper, and primer it, and that's it. You're finished, okay? However, I'll show you another way where you're gonna have to-- you're gonna do a lot better job. A lot better job.

10** Always make sure that you feel in between you sand. Make sure that the glazing putty is filling up the area it's supposed to-- it's supposed to smooth. Make sure that you don't create anything such as dents or high spots. You have to make the job very smooth, very presentable. If it's your car, naturally you want it very smooth. Right now I'm finished sanding my glazing putty. You notice that it's filled up scratches. Also that it's filled up minor imperfections in the body. You notice the heavy area of green. You notice that it's gone around the feather-edge also, and the scratches are all filled.

11** In production I would go over it again, like I said, with the fine grit paper, and shoot my primer. However, I'll just leave it this way, shoot my primer, and try to fill up what scratches I have, with the primer surfacer. Because usually, with your primer surfacer you are able to do that type of a job. You can build up your primer so that it does fill your small sand scratches. Again, spray the primer very lightly, very transparent, let it flash, if there is any, go over again also, again letting this flash, the second coat. Then your third coat-- it's a lot heavier. Let that flash. And I'll build this one up with primer. To give you an idea that there are more than one way of preparing a car. A lot of methods, you try not to restrict yourself to one. Unless you're working at a-- at one shop (you know) and they want you to do a job a certain way. If I was working in my shop this would be finished, ready to paint.

However, I'd like to try and fill the scratches up with the primer surfacer. Again, I have to let it flash before it's ready. The next coat. I'm putting on the fourth coat of primer now so I can try and fill up all the scratches I've left with my sandpaper. I'll let this flash, probably put on two more coats, and then if I have to, I'll spot-putty. Okay, that should be enough primer, and I know that most of the scratches I left behind will be filled by this primer, so all I have to do is look for the very deep scratches and put again another coat of glazing putty over that. Don't get over-anxious and put your putty on and then end up peeling off all the primer and

11** (continued)

starting over again. So what you gotta do is you let your primer sit for a while. If you're in a shop, if you're letting it sit, go jump on another job, or do something else on the car-- repair another area, primer another area, or glaze-- spot glaze another area.

12** Okay, when you spot putty, look at your area very good. Try to find the small nicks, try to look for maybe cracks that have been left behind. Have to make sure you get all the nicks, as much sand-scratches as possible that you think the primer hasn't filled up. So preparing for paint is important. Make sure you do the steps properly, if not my way, your boss's way or the person you're working on. If he tells you a way, do it his way, okay? Unless you're running your own shop, then you can do it your way.

13** I'll be sanding it down now and basically telling you what I'm doing as I go along. So right now I'll sand down all this green putty and then I'll prime the area again. Remember when you sand, try to cross-sand your-- even your glazing putty. Try to feel the areas also. Right now I'm using an eighty-grit sandpaper, fre-cut, and I'll go over it with a two twenty fre-cut sandpaper also. As you can see, it's cutting very fast, very quickly. If you can notice, the glazing putty has done its job, the spot putty, by filling up the various scratches, slight dents in the primer, or in the car body itself, and also filled up very many scratches, sand scratches. From here I'll go with a two twenty fre-cut to sand down the rough edge, the rough sand scratches that I left behind with the eighty-grit. This way I

"11** (continued)

have a finer sandpaper for a finer job. After that's completed, you can prime the area again, and from there do further preparation. Try to clear the surface you're gonna prime. And remember what I taught you folks last time about your-- your primer, okay? Watch how it goes on, watch my wrist movement, also watch the type of overlap I'm gonna be using. Again, you always use the fifty percent overlap whether you're priming or painting. Also, make your proper adjustments on your gun first. If you can see it, it's going in wet, it's not going on dry. I'm letting it flash at the top so I can go over it again with another coat. Remember to let your primer flash, like I said last time, in order (you know) to have a good surface. (-------) From here, you'll be doing your final operations in your painting preparation.

UNIT XII

VIDEO LECTURE

FINAL PREPARATION AND SPOT PAINTING

SERIES A (Part 1)
SERIES B (Parts 1**-3**)

1** Okay, before you final sand your primer with a very fine sandpaper, what you have to do is compound the edge of the surrounding area of your primer. Remember this is not a complete paint job. What you're doing is spot-- spot painting, so that means all you want to do is paint a certain portion of your car, or a certain spot. First of all you compound the edge. Stay with a very fast rubbing compound. I'll be using this compound maybe about an arm's length away. Either that, or it could-- say maybe about two feet outside the area, outside the edge of the primer outwards. Besides using the compound, I'll be using a buffing machine, which will (you know) eliminate a lot of elbow work, and this machine will do the compounding job for me. All I do is put the compound onto the car, turn the machine on, rub the compound around the area, say in about a two--two-foot radius, and from there I'll go into sanding the primer. The compound is an abrasive, it's used in a very fine abrasive, used to-- just like-- sand the surrounding areas so that when you paint, when you blend in your color, or you spread excess amount of paint to the side, it'll go onto the surface itself, the surrounding areas, and it will adhere and create your paint job. Also again, this here resembles, this tool here is a buffer. It resembles your disc grinder; however it rotates at a slower

1** (continued)

speed. This head here rotates slower than your grinder, and your trigger is here, it's on off. Turn it to the side, it goes on. Again, use this with care, it's a very dangerous tool. Once you get caught with it, it has the power of (you know) coming out of your hand and getting out of control. So you try not to go into edges where your buffing pad will get caught and send this machine out of control.

2** First of all put your compound on the area which you'll be painting. On the outer edge. Again (you know) either an arm's length away, or say-- about two feet. You notice I did have a little bit of problem with the buffer itself. I did catch it on the edge. So you know it is quite dangerous. Notice, however, look at the edge on the outside, where the primer was very rough, very dry. Look at it now, the compound has taken away that roughness on the outer edge, and from here you go into sanding your primer. The outside edge is taken care of, now you work on your inside. Try to sand it as smooth as possible, and try to keep looking at your primer to see if there's any scratches that have been left behind. Try not to leave any type of scratches, okay?

3** Again, something about sanding-- when you're about finished sanding, try to make all your sand-scratches move in one direction. In this case, this is a trunk lid or a deck lid. Therefore (you know) when you're inside the car you'll be looking at it from this direction, okay? You'll be looking at it in this direction, so try to use all your sand-scratches in that

3** (continued)

direction also. If it's on a door, maybe, you could make it either go up and down or from side-to-side, depending upon how your customer would look at it, or how you will look at it. However, the main thing is, keep all the sand-scratches going in one way when you're using the fine sandpaper, okay? Something to think about is that-- try not to sand too much off because you have to have a primer surface, in order for your paint to adhere very well over your repaired area. If you didn't repair the area (you know) all you have to do is to-- to sand it slightly and shoot your paint. However, if you have a repaired area with Bondo on it, or glazing putty, try to cover it with your primer. After this what you do is try to blow it off again, either with an air gun or using only the air coming from your primer gun. Keep the surface free from dust, make sure your area is smooth. And you're ready to paint.

SERIES A (Part 2)
SERIES B (Parts 4**-8**)

4** Your first step in painting is-- or your touch-up-- is to make sure you have a paint that's the right color. You don't want to be putting a black on a white. So when you mix your paint, match it, try to get it as close as possible. Here you have your spray gun, got your paint. You have your can of paint, a mixing stick, and your laquer thinner. You're working with a lacquer paint, not working with enamel. Enamel-- the enamel paint job will be in a different lesson. First of all, your gun has to be in working order, otherwise you're dead. So make

4** (continued)

sure your gun is working. Remember again, check your fan, your fluid, and your air pressure when you're working with your spray gun. Okay, painting, again, is hazardous to your health. Whenever possible, maybe you should (you know) wear a respirator. Adjust your fan, see if your fan is working, adjust your fluid, see if that's working, notice it's very light now compared to something like this. Remember your air pressure. More air pressure, a lot more paint will come out, and therefore, you work-- you have to work very quickly. Get your paint, make sure it's mixed very well.

5** And, to tell you something about lacquers, your lacquer paint dries through-- through the use of evaporation of your thinners inside your paint. Meaning that the type of reduction you're using is with lacquer thinner. Your lacquer thinner, mixed with your lacquer paint, will go onto the surface and while it's on the surface, the lacquer thinner will evaporate from the paint, leaving only the paint on the repaired area. Your reduction on lacquer paint is usually about two-to-one. So about one part of paint to two parts thinner. You could go thicker, you could go thinner, depending on the way you want to work, depending upon how much you gotta cover. So usually two-to-one or maybe one and a half-to-one. Inside my cup here I have maybe about this much of paint. My reduction will be maybe one and a half, which will be this much, plus half of that, okay, so about here, I'll end up with this much paint in my gun, my cup. Your primer reduction is strictly one-to-one. Want to

5** (continued)

use it to fill up scratches, want to use it so that it will cover your repaired areas. Your lacquer paint is a one and a half to say about three--three-to-one. Could go either way. Make sure that you mix your paint well. After you've done that you're ready to spray.

6** Another thing to tell you is-- about your lacquer-- is that (you know) when you do lacquer jobs you'll tend to be thinning down your paint a lot, quite often, to cover your repaired area with your first paint, first coat of paint, second coat of paint, like that, until the primer can't be seen. From there, mix a little bit more paint, and you reduce it a lot thinner, say about one part, or half a part thinner than what you had before. So if I had say-- one and a half parts of thinner to one part of paint, in my final coats I'll be making it close to two and a half parts of thinner to one part of paint. So the reduction will get thinner and thinner as you go into your final steps in painting.

7** First of all, all the area is ready to paint and I want to cover this area, so I use probably a thicker--thicker type of paint, okay, something that's not reduced as much as it will be in my final coat. Try to remember too that you want the paint going onto the surface so you try to use a very low air pressure. Use a low air pressure, that way all the paint, instead of going into the air as overspray, like that, it'll go onto the car body as paint. Again, try to put it on wet, okay, don't go in as transparent coats, just try to go in with wet coats.

7** (continued)

Remember your overlap is fifty percent. Let it sit for a while, you don't want it--want the paint running on you. Too much paint will cause it to collect in one area. That means like I put too much paint up here, because the panel is sloping downwards the paint will run down. You don't want that, that's a lot more work to do later on. So try to put it on very smooth, very evenly. Again, try to cover your primer, using the same type of stroke as your primer gun. At the end of each stroke try to crack your wrist. And wait. So that would be your cover coat for your paint.

8** Okay. In this part of your painting lesson, you reduce your paint again, (you know) one part. I reduced it one part so it's very thin inside here. I have a lot of paint, and I'm gonna from here blend in the color. Right about now you're supposed to be asking the journeyman or even yourself, (you know) if the color is matching right, if you have to add a different shade of color inside of it, or if you can use the paint as it is. However, find out if the paint matches first from your boss. Or if you can see it yourself, try to match it. First of all when you start blending in, what you do is you start from the outside edge and work your way in again. Again, crack your wrist, apply the paint wet. From here most shops will either let it go and compound it, compound the edge and the area that's been repaired and buff it out so that the shine and gloss is there, so that it looks new again. Some shops will sand it

8** (continued)

with a six hundred sandpaper, and re-shoot a thinner coat so that this will come down to a smoother finish. It depends upon your boss. It depends how you learn it elsewhere. It depends how you want to work. Basically though, to end this lecture I'll tell you something that-- well-- I've left out a lot of steps. I have-- I cannot give you the complete run-down of how to touch-up. So like if you go to work and the boss tells you something, listen to your boss, okay? Remember that, okay? I've only given you some helpful hints, and some ideas of your painting. However, I've left out a lot. Try to learn what you can about it. Well, that's it.

EXERCISES ANSWER KEY

FOR

HEARSAY WORKBOOK

SERIES A

EXERCISES ANSWER KEY - SERIES A

UNIT I

(Part 1)
Multiple Choice

1. a,b,d. 2. b. 3. c. 4. a. 5. a,c,e,f.

(Part 2)
Short Answer

1. $2.40 to a little over $7.00 2. his rating

3. $2.40 4. $7.00 or a little over that

5. perform well, work fast, and do jobs that will please the customers

6. He's in the job to make money. 7. work hard and fast

8. satisfying

(Part 3)
Fill in the Blanks

1. hazardous 2. particle mask 3. respirator

4. goggles 5. welding goggles 6. fire extinguishers

7. steel-toed shoes 8. 911

Pick the Pictures

1. b. 2. d. 3. c. 4. a. 5. f. 6. e.

(Part 4)
Multiple Choice

1. a,b,d. 2. a,b,c,d. 3. a,b,d. 4. a,d. 5. b,d,e,f.

6. a,b,c. 7. a,c,d.

UNIT II

(Part 1)
Fill in the Blanks

1. tools, basic hand tools 2. hammers, all-purpose dolly

3. finishing 4. back, face 5. handle

Short Answer

1. a wedged-styled back, and a slightly rounded or crowned face.

2. crowned 3. bumping and dinging

4. smoothening out damaged metal

(Part 2)
Short Answer

1. The head is long and pointed, and the face is crowned. (slightly rounded)

2. picking up low spots 3. file off the slight hill

4. The face has ridges on it. 5. the face

6. The shrinking hammer is used for bringing down slight bulges in metal.

7. the ridges

(Part 3)
Multiple Choice

1. b,c,d. 2. b. 3. b,d. 4. c. 5.a. 6. b. 7. a.

Pick the Pictures

1. e. 2. a. 3. b,d. 4. c.

(Part 4)
Short Answer

1. grabbing things, holding onto things, prying things

2. 1/4" (quarter-inch), 3/8" (three-eighths inch)

3. You can have a longer reach at things with the extensions.

4. used for putting on and taking off nuts and bolts

5. for different-sized jobs

Label the Pictures

1. extension 2. socket 3. drive ratchet 4. pliers

(Part 5)
Multiple Choice

1. a,d. 2. c. 3. a,c.

(Part 6)
Multiple Choice

1. c,d. 2. a,b,c,d. 3. a,c,d.

Label the Pictures

1. roloc disc 2. standard screwdriver 3. wire-end brush

4. phillips screwdriver

(Part 7)
Multiple Choice

1. a,b,c. 2. b,d. 3. c. 4. a,c,d,f. 5. b.

6. b,c,d. 7. d. 8. b,c,d. 9. a,c. 10. a,b.

Pick the Pictures

1. c. 2. b. 3. a.

(Part 8)
Short Answer

1. a handle, a sliding weight, a shaft, a sheet metal screw

Number in Order

2 3 1 4

Multiple Choice

1. b,d. 2. a,d. 3. c. 4. a,b,d. 5. b,c. 6. c.

Label the Pictures

1. reverse hammer 2. tape measure 3. tin-snips

4. blow gun

(Part 9)
Multiple Choice

1. a,d. 2. c. 3. b,c,d. 4. a,b,d.

Pick the Pictures

1. a,b. 2. a,b. 3. c.

UNIT III

(Part 1)
Multiple Choice

1. b,c. 2. c. 3. b. 4. b,c. 5. a. 6. c,d.

(Part 2)
Short Answer

1. two 2. electricity 3. on the handle

4. the handle on the side which you use to control the grinder

5. about one and a half feet long 6. about seven pounds

7. 4,000 r.p.m. to 5,500 r.p.m. 8. You will get a big cut.

True-False

1. T 2. T 3. F 4. T 5. F

Fill in the Blanks

1. rust, paint, bumps (small imperfections) (minor irregularities)

2. low spots 3. lead, dents

Pick the Pictures

1. a. 2. b. 3. b. 4. a.

(Part 3)
Multiple Choice

1. a,b. 2. a,d. 3. a,b.

Short Answer

1. feather-edger 2. three inches by nine inches

3. a special type of sandpaper 4. on the top

5. palm it 6. with one hand on the handle and the other on the top

7. smoothening plastic filler

Pick the Pictures

1. a. 2. b.

(Part 4)
Fill in the Blanks

1. sanding and smoothening your plastic filler

2. straight-line sander 3. two 4. trigger, ball-knob

5. speed file 6. air, hand (elbow grease) 7. three, eight

8. six and a half 9. to smoothen plastic filler

Label the Pictures

1. speed file 2. straight-line sander

(Part 5)
Multiple Choice

1. b. 2. b. 3. b. 4. a. 5. a,c. 6. a,d.

Label the Pictures

1. polisher (air buffer) 2. disc grinder 3. polisher (air buffer)

Multiple Choice

1. b,c. 2. a.

(Part 6)
Multiple Choice

1. a,b,c. 2. b,c. 3. b. 4. a,b,d. 5. c.

Label the Pictures

1. orbital sander (rectangular) 2. polisher (air buffer)

3. air wrench (hand form shape) 4. disc grinder (large)

5. zip gun 6. disc grinder (small, pistol grip)

7. orbital sander (round) 8. straight-line sander

9. polisher (air buffer) 10. zip gun attachment

UNIT IV

(Part 1)
Multiple Choice

1. b. 2. a. 3. a,d. 4. a,b,d. 5. b.

Pick the Pictures

1. b. 2. a.

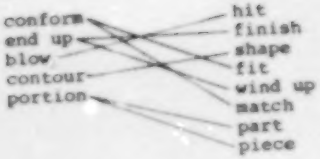
Pick the Pictures

1. a,c.

(Part 2)
Multiple Choice

1. c. 2. c. 3. b,d. 4. b,d. 5. a,d.

Draw Lines



(Part 3)
Multiple Choice

1. b,c. 2. a,b. 3. a.b.d. 4. a,c. 5. b. 6. a,b.

(Part 4)
Fill in the Blanks

1. high 2. low 3. high 4. push up

Multiple Choice

1. a.

Pick the Pictures

1. b.

UNIT V

(Part 1)
Fill in the Blanks

1. quality 2. pick hammer, Vixen file 3. point

4. handle, blade (cutting edge) 5. edge

6. autobody repairmen, people who want a quality job, friends of autobody repairmen

7. it takes so long, you lose money

Pick the Pictures

1. c.

(Part 2)
Short Answer

1. towards the head 2. cradling the handle 3. wrist

4. Feel the area you want to pick up, put the pick hammer underneath, tap the area with the pick, feel the vibration of the taps under your fingers, then pick up.

5. no

(Part 3)
Multiple Choice

1. a,b. 2. b,d. 3. b. 4. d. 5. a,b,c,d.

Short Answer

1. Pick up all the low spots and file them all off.

2. The low spots have been picked up when the whole area is shiny metal (when there is no more paint in the area).

3. It takes a long time

UNIT VI

(Part 1)
Short Answer

1. large, heavy, dangerous, handy 2. electricity

3. remove rust, take off paint, locate low spots, smoothen metal

4. handle, backing pad, center locking unit, abrasive disc, motor, electrical cord

(Part 2)
Multiple Choice

1. a,c,d. 2. a. 3. a,b.

Draw Lines

Multiple Choice

1. c,d. 2. d.

Number in Order

7 3 8 2 5 1 4 6

Multiple Choice

1. b,c. 2. a,d.

(Part 3)
Multiple Choice

1. c. 2. a,c. 3. b. 4. a,b,c,d. 5. c,d. 6. a,d.

7. c. 8. a,d.

UNIT VII

(Part I)
Multiple Choice

1. a,b,d. 2. c. 3. a. 4. c,d. 5. a,b,c. 6. d.

7. a,d. 8. c. 9. a,b. 10. b. 11 c. 12. a. 13. d.

(Part 2)
Multiple Choice

1. a,d. 2. a. 3. b. 4. a,c. 5. c. 6. a,d.

7. a,c. 8. c. 9. b,c. 10. b,c. 11. a,d. 12. c.

(Part 3)
Multiple Choice

1. b. 2. b,c. 3. a,c,f,g. 4. c. 5. a,d. 6. d.

7. a.

UNIT VIII

(Part 1)
True-False

1. F 2. T 3. F 4. T 5. T 6. F

Fill in the Blanks

1. oxygen 2. acetylene 3. silver, red, orange

4. acetylene 5. oxygen 6. gauges 7. gauges

8. release (turn on) 9. red 10. green 11. removable

12. valves 13. access 14. offset

Short Answer

1. wire brush, striker, hammer, welding goggles, tip cleaner, welding and brazing rods

2. welding rods, regular brazing rods, flux-coated brazing rods

3. bonding two different metals together (putting on patches)

4. bonding two similar metals together (repairing tears in fenders)

(Part 2)
Cloze

welding safety remember goggles sparks

protect burned darker better instead

striker light gas striker

Short Answer

1. Stand away from your regulator.

2. The regulator might zip off. 3. Acetylene gas is very toxic.

4. Get leaks repaired right away.

5. The whole place might blow up. 6. yes

Number in Order

6 3 2 7 4 1 5

Fill in the Blanks

1. smoke 2. feather, smoke, bluish 3. cone

4. hissing 5. white, cones 6. oxygen

Short Answer

1. Grind it down to bare metal. 2. to weld two similar metals

3. to pound your weld down 4. to keep the area clean

5. to quench the area 6. The panel might warp.

Multiple Choice

1. c. 2. d. 3. b. 4. a. 5. b. 6. d. 7. a,c.

(Part 3)

Fill in the Blanks

1. cone 2. circles 3. down the line 4. your coordination

Short Answer

1. One is more convenient than the other. 2. flux

3. Heat it and dip it in a can of flux.

4. the regular brazing rods, because they're a lot cheaper.

5. no 6. dull red (cherry red) 7. a neutral flame

8. Heat it and dip it into the can of flux.

9. Dip it again when it runs out of flux.

10. to keep the metal chemically clean

Fill in the Blanks

1. a big bead is inconvenient when you hammer it or grind it

2. small, thin 3. countersink 4. clean the area

5. uniform, even

Number in Order

3 6 1 7 2 4 5

Label the Pictures

1. a continuous weld 2. a tack weld 3. a stitch weld

Multiple Choice

1. b. 2. c,d. 3. a,b,c.

Number in Order

1 5 3 4 6 7 8 2

UNIT IX

(Part 1)
Multiple Choice

1. b. 2. a,d. 3. a,d. 4. a,c. 5. a,b,d. 6. b,d.

7. d. 8. a,b,c.

(Part 2)
Short Answer

1. the cup 2. the handle 3. the trigger 4. the head

5. the fluid adjustment 6. the air pressure knob

7. the air pressure gauge 8. the no-drip spout

9. the fan adjustment (pattern adjustment)

Multiple Choice

1. a,b. 2. a,d. 3. b,c. 4. a,d. 5. a,d. 6. b. 7. a.

Label the Pictures

1. head 2. air horns 3. air cap 4. fan adjustment (pattern adjustment)

5. fluid adjustment 6. trigger 7. gun handle

8. air adjustment (air pressure knob) 9. air pressure gauge

10. paint cup

UNIT X

(Part 1)
Fill in the Blanks

1. touch-up (spot painting), complete

2. acrylic lacquer, acrylic enamel, synthetic enamel

3. acrylic enamel, synthetic enamel, acrylic lacquer

Multiple Choice

1. c. 2. a,b,c,d. 3. a. 4. a,b,c. 5. a,b,d.

(Part 2)
Number in Order

2 1 3

Multiple Choice

1. a,b,c,d. 2. a,c. 3. b,c,d. 4. c. 5. b,c.

6. a,b. 7. a,b,c. 8. a,b,d. 9. a,b,c.

Short Answer

1. to remove all the dust 2. It will look dirty.

3. inside the engine compartment, inside the trunk, inside the tire openings, inside the doors

(Part 3)
Multiple Choice

1. a,b. 2. b,c. 3. a,b. 4. a,c,d. 5. c,d.

Fill in the Blanks

1. lacquer thinner 2. enamel reducer

3. the painter, the instructions on the can, experience with the paints.

4. reading the instructions on the paint can 5. furthest

6. fast, well

UNIT XI

(Part 1)
Fill in the Blanks

1. preparing for paint 2. base 3. power tools, hand tools

4. good , shop 5. shop

Short Answer

1. feather-edger (orbital sander) (dual-action sander)

2. putty knife, squee-gee 3. 3-M brand 4. sanding block

5. primer gun

(Part 2)
Fill in the Blanks

1. feather-edge 2. orbital sander, feather-edger

3. 220 4. feel 5. flat

Multiple Choice

1. c. 2. a,c. 3. d. 4. a,b,c. 5. b,c. 6. b,c.

7. a,b,d. 8. a,d. 9. c. 10. c. 11. b.

Short Answer

1. to fill scratches that are left by your grinder 2. no

3. The putty will crack.

Fill in the Blanks

1. transparent 2. sit (flash) 3. sit

(Part 3)
Fill in the Blanks

1. 150 2. water 3. very rough, smooth 4. fine

Multiple Choice

1. a,d,e. 2. a,b.

Fill in the Blanks

1. feel 2. dents, high 3. scratches 4. fine grit

5. primer (primer surfacer) 6. 5 7. flash 8. jump

9. 80, 200 10. blowing 11. 2

UNIT XII

(Part 1)
Short Answer

1. rubbing compound, buffing machine (buffer)

2. an arm's length away (2 feet) 3. It sands the surrounding areas.

4. Compounding will make the paint adhere to the surface.

5. the disc grinder 6. It rotates slower than the grinder.

7. Don't buff the edges, where the buffer will get caught.

8. The compound takes away the roughness of the primer edge.

9. a sanding block

10. The same direction the customer will be looking at it.

11. You need a primer surface for the paint to adhere to.

12. Blow off the surface with your air gun or air from your primer gun.

(Part 2)
Short Answer

1. spray gun, can of paint, mixing stick, laquer thinner, respirator

2. fan, fluid, air pressure

3. evaporation of the thinners inside the paint

4. two-to-one or one and a half-to-one 5. one-to-one

6. two and a half-to-one

Fill in the Blanks

1. thicker 2. low 3. transparent 4. 50 5. sit; run

6. run 7. crack 8. cover coat

True-False

1. F 2. T 3. T 4. F 5. T 6. F

7. T 8. T 9. F 10. F 11. T 12. F

EXERCISES ANSWER KEY

FOR

HEARSAY WORKBOOK

SERIES B

EXERCISES ANSWER KEY - SERIES B

UNIT I

(Part 1)
Multiple Choice

1. b. 2. b. 3. a,c. 4. b,d.

(Part 2)
Cloze

is	you	probably	on	larger	that
as	paints	cars	look		

(Part 3)
Short Answer

1. yes 2. $2.40 to a little over $7.00

3. your rating 4. $2.40 5. $7.00 or a little over that

(Part 4)
True-False

1. T 2. T 3. T 4. F 5. T 6. F

7. T 8. F 9. F 10. T

(Part 5)
Fill in the Blanks

1. hard, hazardous 2. alive (uninjured) 3. masks

4. particle mask, respirator 5. particle mask

6. respirator

Label the Pictures

1. respirator 2. particle mask

(Part 6)
Fill in the Blanks

1. goggles, welding goggles 2. goggles

3. welding goggles

Label the Pictures

1. welding goggles 2. goggles

(Part 7)
Multiple Choice

1. b,d,e.

Short Answer

1. steel - toed shoes 2. emergency number 911

3. fire extinguishers

Pick The Pictures

1. b 2. a

(Part 8)
Multiple Choice
1. a,b,d. 2. a,b,c,d. 3. a,b,d. 4. a,d.

(Part 9)
Multiple Choice

1. b,d,e,f. 2. a,b,c. 3. a,c,d.

UNIT II

(Part 1)
Fill in the Blanks

1. tools 2. basic hand tools 3. hammers

4. all-purpose dolly

(Part 2)
Fill in the Blanks

1. finishing 2. wedge-styled 3. rounded (crowned)

4. handle 5. bumping, dinging 6. smoothening out

(Part 3)
Multiple Choice

1. b,d, 2. a,c. 3. d. 4. a. 5. d. 6. b.

(Part 4)
True-False

1. T 2. F 3. T 4. T 5. F

(Part 5)
Multiple Choice

1. b,c,d. 2. b. 3. a,c.

Pick the Pictures

1. a. 2. c. 3. d. 4. b.

(Part 6)
Multiple Choice

1. c. 2. a. 3. b. 4. a.

(Part 7)
Label the Pictures

1. picking hammer 2. all-purpose dolly 3. finishing hammer
4. ball-peen hammer 5. shrinking hammer

Fill in the Blanks

1. grabbing, holding 2. pry

Label the Pictures

1. water-pump pliers 2. regular pliers

(Part 8)
Multiple Choice

1. b,c. 2. b. 3. a,b,c. 4. b,d.

Label the Pictures

1. socket 2. extension 3. drive ratchet

(Part 9)
Multiple Choice

1. a,d. 2. c. 3. a,b,c. 4. b. 5. c.

Pick the Pictures

1. b. 2. c. 3. a. 4. d.

(Part 10)
Multiple Choice

1. c,d. 2. b. 3. a,b,c,d.

(Part 11)
Fill in the Blanks

1. wire end brush 2. cannot remove the rust

3. drill 4. clean out

Label the Pictures

1. wire end brush 2. roloc disc

(Part 12)
Multiple Choice

1. c. 2. a,b,c. 3. b,d. 4. c. 5. a,c,d,f.

(Part 13)
Multiple Choice

1. b. 2. b,c,d. 3. a, 4. d 5. b,c,d.

(Part 14)
Multiple Choice

1. a. 2. b,d. 3. a,b. 4. a,b.

Pick the Picture

1. a. 2. c. 3. b.

(Part 15)
Short Answer

1. handle, sliding weight, shaft, sheet metal screw

Number in Order

2 3 1 4

Multiple Choice

1. b,d.

(Part 16)
Multiple Choice

1. a,d. 2. b,c. 3. b. 4. b,c. 5. a,b,d.

6. c.

Label the Pictures

1. tape measure 2. tin snips 3. reverse hammer

4. blow gun

(Part 17)
Multiple Choice

1. a,d. 2. c. 3. b,c,d. 4. a,b,d.

Pick the Pictures

1. c. 2. a. 3. b,c.

UNIT III

(Part 1)
Multiple Choice

1. b,c. 2. c. 3. b. 4. b,c. 5. a. 6. c,d.

(Part 2)
Fill in the Blanks

1. disc grinders 2. handles 3. electricity

4. handle 5. trigger 6. switch

(Part 3)
Short Answer

1. 1 1/2 feet long 2. about 7 pounds 3. it is dangerous

4. 4,000 - 5,500 r.p.m. 5. You will get a big cut.

(Part 4)
True-False

1. T 2. T 3. F 4. T 5. F

Fill in the Blanks

1. rust, paint, small imperfections (bumps)(minor irregularities)

2. low spots 3. lead, dents

Pick the Pictures

1. b. 2. a.

(Part 5)
Multiple Choice

1. a,b. 2. a,d. 3. a,b.

(Part 6)
Short Answer

1. feather-edger 2. 3 inches by 9 inches

3. a special type of sandpaper 4. on the top

5. palm it 6. one hand on the handle, one hand on the top

(Part 7)
Fill in the Blanks

1. plastic filler 2. smooth, smooth 3. bumps, dips

4. sanding, smoothening

(Part 8)
Fill in the Blanks

1. smoothening plastic filler 2. straight-line sander

3. two 4. trigger, ball-knob 5. speed file

6. air, hand (elbow grease) 7. three, eight

8. six and a half 9. to smoothen plastic filler

Label the Pictures

1. speed file 2. straight-line sander

(Part 9)
Multiple Choice

1. b. 2. b. 3. b. 4. a. 5. a,c. 6. a,d.

Label the Pictures

1. air buffer(smaller) 2. disc grinder 3. air buffer (larger)

Multiple Choice

1. b,c. 2. a.

(Part 10)
Multiple Choice

1. a,b,c. 2. b,c. 3. b. 4. a,d. 5. c.

Label the Pictures

1. rectangular orbital sander 2. larger air buffer

3. hand-form air wrench 4. large disc grinder

5. zip gun 6. pistol grip disc grinder

7. round orbital sander 8. straight-line sander

9. smaller polisher 10. zip gun attachment

UNIT IV

(Part 1)
Multiple Choice

1. b. 2. c,d. 3. c. 4. a,d.

Pick the Pictures

1. a,c.

(Part 2)
Cloze

using you Okay home grip away right

the nail done work real control

(Part 3)
Multiple Choice

1. a,b,c. 2. b. 3. b. 4. a.

Pick the Pictures

1. b. 2. a.

(Part 4)
True-False

1. T 2. F 3. T 4. F 5. T 6. T

7. F 8. F

(Part 5)
Multiple Choice

1. b,d. 2. b,d. 3. a,c.

(Part 6)
Multiple Choice

1. b,d. 2. a,d.

(Part 7)
Multiple Choice

1. c 2. a,b. 3. b,c. 4. a,b,d. 5. a,c. 6. b.

7. a,b.

(Part 8)
Fill in the Blanks

1. high 2. low 3. high 4. bounce

Pick the Pictures

1. a. 2. b.

UNIT V

(Part 1)
Short Answer

1. picking and filing 2. a quality job 3. pick hammer, Vixen file
4. the point 5. the handle 6. the blade (cutting edge)

7. your own car, or the car of somebody who wants a quality job.

8. no

(Part 2)
Multiple Choice

1. a. 2. a. 3. d. 4. c.

Pick the pictures

1. c

(Part 3)
True-False

1. T 2. F 3. T

Number in Order

4 2 1 3

(Part 4)
Fill in the Blanks

1. pick up 2. pushing, pulling 3. grooves, ridges

4. curve 5. push, pull 6. cuts

(Part 5)
Multiple Choice

1. d. 2. a,b,c,d.

Short Answer

1. pick up all the remaining low spots and file them all off.

2. The area will be all shiny metal. 3. It takes a long time.

UNIT VI

(Part 1)
Multiple Choice

1. a,b,d,e,f. 2. b. 3. b,c,d,e.

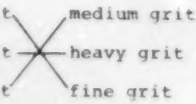
Short Answer

1. handle, on-and-off switch, backing pad, center lock unit, abrasive disc, motor, cord.

(Part 2)
Multiple Choice

1. a,c,d. 2. a 3. a,b.

Draw Lines



Multiple choice

1. c,d. 2. d.

(Part 3)
Number in Order

7	3	8	2	5	1	4	6

(Part 4)
Cloze

types start fine the a to gonna you're metal grit with with all no metal job is area possible the grinding for degees on

Multiple Choice

1. a,d. 2. b,d. 3. a,d.

(Part 5)
True-False

1. T 2. F 3. F 4. T 5. F

6. T 7. F 8. F 9. T 10. T

(Part 6)
Fill in the Blanks

1. safety 2. dangerous 3. rotates

4. 4,500, 5,500 5. a slice (a cut)

6. anything (your hand)

(Part 7)
Multiple Choice

1. a,c. 2. b,c. 3. a. 4. a,c. 5. c,d.

(Part 8)
Multiple Choice

1. b. 2. a,d. 3. b,c,d.

(Part 9)
Multiple Choice

1. a,b,c,d,e. 2. c,d. 3. c,d.

(Part 10)
Multiple Choice

1. a,d. 2. b,c. 3. c. 4. a,d.

UNIT VII

(Part 1)
True-False

1. T 2. T 3. F 4. F 5. F 6. T

(Part 2)
Multiple Choice

1. a. 2. c,d. 3. c,d. 4. a,b,c. 5. d. 6. a,c.

(Part 3)
Fill in the Blanks

1. mixing pan 2. flat 3. glass 4. sheet metal

5. mix 6. cardboard 7. liquids

(Part 4)
Multiple Choice

1. a,b. 2. c. 3. d. 4. b. 5. b. 6. c. 7. c. 8. d.

(Part 5)
Multiple Choice

1. a,d. 2. a. 3. b. 4. a,c. 5. c.

(Part 6)
Short Answer

1. Scrape it off the top of the can. 2. It's expensive.

3. On the top it's softer, and on the bottom it's harder. 4. The heavier material tends to settle to the bottom of the can.

5. the putty knife

(Part 7)
Fill in the Blanks

1. cream hardener 2. catalyst 3. hard 4. can 5. massage

6. experience 7. liquids 8. directions 9. red 10. grey

(Part 8)
Multiple Choice

1. b,c. 2. a,d. 3. a. 4. a,d. 5. c.

(Part 9)
Fill in the Blanks

1. set up 2. dust 3. dust 4. hazardous 5. particle mask

(Part 10)
Multiple Choice

1. b,c. 2. a,c,f,g. 3. c. 4. a,d. 5. d.

UNIT VIII

(Part 1)
True-False

1. T 2. T 3. F 4. T 5. F 6. T

7. T 8. F

(Part 2)
Fill in the Blanks

1. oxygen 2. acetylene 3. silver, red, orange

4. acetylene 5. oxygen 6. gauges 7. gauges

8. release (turn on)

(Part 3)
Fill in the Blanks

1. red 2. green 3. removable 4. valves 5. access

6. offset

(Part 4)
Short Answer

1. wire brush, striker, hammer, welding goggles, tip cleaner, welding and brazing rods.

2. welding rods, regular brazing rods, flux-coated brazing rods.

3. welding rod 4. brazing rod 5. welding rod

(Part 5)
Cloze

welding safety remember goggles sparks

protect burned darker better instead

striker light gas striker

(Part 6)
Short Answer

1. Stand away from the regulator 2. The regulator might rip off.

3. Acetylene gas is very toxic. 4. Get leaks repaired right away.

5. The whole place might blow up. 6. Yes.

(Part 7)
Short Answer

1. oxygen tank 2. all the way 3. Do it his way.

4. acetylene tank 5. a quarter-turn 6. the dials

7. use the regulator 8. 10 on the oxygen, 5 on your acetylene

(Part 8)
Fill in the Blanks

1. smoke 2. feather, bluish 3. cone 4. hissing

5. white, cones 6. oxygen

(Part 9)
Short Answer

1. Grind it down to bare metal. 2. to weld two similar metals

3. to pound your weld down 4. to keep the area clean

5. to quench the area 6. The panel might warp.

(Part 10)
Multiple Choice

1. c. 2. d. 3. b. 4. a. 5. b. 6. d. 7. a,c.

(Part 11)
Fill in the Blanks

1. good, bad (chicken-shit) 2. comfortable 3. cone

4. circles 5. down the line 6. your coordination

(Part 12)
Short Answer

1. One is more convenient than the other. 2 flux

3. Heat it and dip it in a can of flux.

4. the regular brazing rods, because they're a lot cheaper

(Part 13)
Short Answer

1. no 2. dull red (cherry red) 3. a neutral flame

4. Heat it and dip it into a can of flux.

5. Dip it when it runs out of flux. 6. to keep the metal chemically clean

(Part 14)
Fill in the Blanks

1. A big bead is inconvenient when you grind it or hammer it.

2. small, thin 3. countersink 4. clean the area

5. uniform, even

Number in Order

3 6 1 7 2 4 5

(Part 15)
Short Answer

1. no 2. so you won't warp your metal 3. probably not

(Part 16)
Fill in the Blanks

1. stitch-weld 2. rod 3. burn 4. continuous

5. a shop, school, home 6. read

Label the Pictures

1. a continuous weld 2. a tack weld 3. a stitch weld

(Part 17)
Number in Order

1 5 3 4 6 7 8 2

UNIT IX

(Part 1)
Multiple Choice

1. b. 2. a,d. 3. a,d. 4. a,c.

(Part 2)
Multiple Choice

1. a,b,d. 2. b,d. 3. d. 4. a,b,c.

(Part 3)
Short Answer

1. the cup 2. the handle 3. the trigger 4. the head

(Part 4)
Short Answer

1. the fluid adjustment 2. the air pressure knob

3. the air pressure gauge 4. the no-drip spout

Label the Pictures

1. head 2. air horns 3. air cap 4. fan adjustment (pattern adjustment)

5. fluid adjustment 6. trigger 7. gun handle

8. air adjustment (air pressure knob)

9. air pressure gauge 10. paint cup

(Part 5)
Multiple Choice

1. c. 2. a,b. 3. a,d. 4. b,c.

(Part 6)
Multiple Choice

1. a,d. 2. a,d. 3. b. 4. a.

UNIT X

(Part 1)
Fill in the Blanks

1. touch-up (spot painting), complete 2. spot, area

3. entire 4. acrylic lacquer, acrylic enamel, synthetic enamel

5. acrylic enamel, synthetic enamel, acrylic lacquer

6. time, work

(Part 2)
Multiple Choice

1. a. 2. c. 3. a.

(Part 3)
Multiple Choice

1. a,b,c,d. 2. b,c,d. 3. a,b,c. 4. a,b,d.

(Part 4)
Number in Order

2 1 3

Short Answer

1. The paint booth is where you spray paint the car.

2. body work 3. preparing the body work for pai g

(Part 5)
Fill in the Blanks

1. spots 2. cleaning, degreaser 3. wax, dirt, silicone

4. Klix, Acme 5. Prep Sol, DuPont

(Part 6)
Multiple Choice

1. b,c,d. 2. c. 3. b,c. 4. a,b.

(Part 7)
Multiple Choice

1. a,b,c. 2. a,b,d. 3. a,d. 4. a. 5. a,b,c.

(Part 8)
Short Answer

1. to blow out all the dust from the seams

2. The paint will look dirty.

3. seams, around the chrome, windshield, inside the engine compartment, inside the trunk, under the tires, inside the tire openings, inside the doors

(Part 9)
Multiple Choice

1. a,b,d. 2. b,d. 3. a,c. 4. a,b.

(Part 10)
Multiple Choice

1. a,b. 2. c,d. 3. c,d.

(Part 11)
Fill in the Blanks

1. laquer thinner 2. enamel reducer

3. the painter himself, the instructions on the can, experience

4. more, less

(Part 12)
Fill in the Blanks

1. reading the directions on your paint can 2. 55, 40, 45, 35

3. panel, two, side 4. fast, paints, fast

(Part 13)
Short Answer

1. the position of the car and location of the fan in the booth

2. so the overspray doesn't go on the parts of the car which are already painted

3. the overspray will go on the places you already painted

UNIT XI

(Part 1)
Fill in the Blanks

1. preparing for paint 2. base 3. power tools, hand tools

4. good , shop 5. shop

(Part 2)
Short Answer

1. feather-edger (orbital sander)(dual-action sander)

2. putty knife, squee-gee 3. 3-M brand 4. sanding block

5. primer gun

(Part 3)
Fill in the Blanks

1. feather-edge 2. orbital sander, feather-edger

3. 220 4. feel 5. flat

(Part 4)
Multiple Choice

1. c. 2. a,c. 3. d.

(Part 5)
Multiple Choice

1. a,b,c. 2. b,c. 3. b,c. 4. a,b,d.

(Part 6)
Multiple Choice

1. a,d. 2. c. 3. c. 4. b.

(Part 7)
Short Answer

1. to fill scratches that are left by your grinder 2. no

3. the putty will crack

Fill in the Blanks

1. transparent 2. sit (flash) 3. sit

(Part 8)
Fill in the Blanks

1. 150 2. water 3. very rough, smooth 4. fine

(Part 9)
Multiple Choice

1. a,d,e. 2. a,b.

(Part 10)
Fill in the Blanks

1. feel 2. dents, high 3. scratches

(Part 11)
Fill in the Blanks

1. fine grit 2. primer (primer surfacer) 3. 5 4. flash

5. jump

(Part 12)
Fill in the Blanks

1. nicks, cracks (sand-scratches) 2. properly 3. his

(Part 13)
Fill in the Blanks

1. 80, 220 2. blowing 3. 2

UNIT XII

(Part 1)
Short Answer

1. rubbing compound, buffing machine (buffer)

2. an arm's length away (two feet) 3. It sands the surrounding area.

4. Compounding will make the paint adhere to the surface.

5. the disc grinder 6. It rotates slower than the grinder.

7. Don't buff on the edges, where the buffer will get caught.

(Part 2)
Multiple Choice

1. a,d. 2. b,d. 3. a,d. 4. c.

(Part 3)
Short Answer

1. yes 2. the direction you or the customer will be looking at it

3. You need a primer surface for the paint to adhere well over the repaired area.

4. blow it off

(Part 4)
Fill in the Blanks

1. match 2. spray gun, paint, mixing, lacquer thinner, respirator

3. fan, fluid, air pressure

(Part 5)
Fill in the Blanks

1. evaporation 2. 1, 2 3. 2, 1, 1 1/2, 1 4. 1, 1

(Part 6)
Fill in the Blanks

1. thinning 2. 1, 1/2 3. 2 1/2, 1

(Part 7)
Fill in the Blanks

1. thicker 2. low 3. transparent 4. 50 5. sit, run

6. run 7. crack 8. cover coat

(Part 8)
True-False

1. F 2. T 3. T 4. F 5. T 6. F

7. T 8. T 9. T 10. F 11. T 12. F